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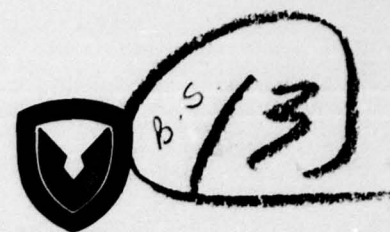
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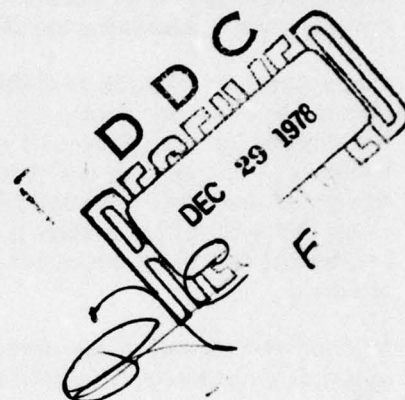
**INTERACTIONAL AERODYNAMICS OF THE SINGLE
ROTOR HELICOPTER CONFIGURATION**

**VOLUME VII-C - Frequency Analyses of Wake Split-Film
Data, Solid Hubcaps**

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September 1978

Final Report for Period March 1977 - February 1978



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Prepared for

APPLIED TECHNOLOGY LABORATORY

U. S. ARMY RESEARCH AND TECHNOLOGY LABORATORIES (AVRADCOM)

Fort Eustis, Va. 23604

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APPLIED TECHNOLOGY LABORATORY POSITION STATEMENT

In 1975 a wind tunnel test program was conducted in the Boeing-Vertol 20-foot V/STOL Wind Tunnel on a 1/5th-scale UTTAS model to investigate and find solutions for several aerodynamic problems encountered during the UTTAS flight-testing. Specifically, these tests focused upon (a) the structure of the hub/rotor wake in the vicinity of the empennage, (b) the formulation of the ground vortex and its relation to hub loads and fuselage loads during transition, and (c) the occurrence of vibratory air pressures from the blade passing over the fuselage. Only portions of the above-mentioned wind tunnel test data were reduced and analyzed in addressing the flight-test problems of the UTTAS aircraft.

Under Contract DAAJ02-77-C-0020, Boeing-Vertol completed analyses on the data to understand more completely the aerodynamic interactions that are involved and to formulate instructions for the guidance of designers in these respects. The results of these studies are applicable to all existing and future single-rotor/tail rotor helicopters. The data have been segregated according to aerodynamic interactions and associated phenomena/problem areas. From this body of knowledge, a generalized set of design guidelines meaningful to the single-rotor helicopter design concept formulation were developed and are included in these reports.

Mr. Robert P. Smith of the Aeronautical Technology Division, Aeromechanics Technical Area, served as project engineer for this effort.

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This is the third of seven sub-volumes of Volume VII containing spectrographs of the model helicopter hub/rotor wake as it was modified by various aerodynamic devices. This sub-volume deals with the effects of solid hub caps. Here the cap underside is flat and does not share the upsides camber as with the open caps.			

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PREFACE

The entire report describing the investigation of **INTERACTIONAL AERODYNAMICS OF THE SINGLE-ROTOR HELICOPTER CONFIGURATION** comprises eight numbered volumes bound as 33 separate documents. The complete list of these documents is as follows:

Volume I, Final Report

Volume II, Harmonic Analyses of Airframe Surface Pressure Data

- A — Runs 7-14, Forward Section
- B — Runs 7-14, Mid Section
- C — Runs 7-14, Aft Section
- D — Runs 15-22, Forward Section
- E — Runs 15-22, Mid Section
- F — Runs 15-22, Aft Section
- G — Runs 23-33, Forward Section
- H — Runs 23-33, Mid Section
- I — Runs 23-33, Aft Section

Volume III, Flow Angle and Velocity Wake Profiles in Low-Frequency Band

- A — Basic Investigations and Hubcap Variations
- B — Air Ejector Systems and Other Devices

Volume IV, One-Third Octave Band Spectrograms of Wake Split-Film Data

- A — Buildup to Baseline
- B — Basic Configuration Wake Explorations
- C — Solid Hubcaps
- D — Open Hubcaps
- E — Air Ejectors
- F — Air Ejectors With Hubcaps; Wings
- G — Fairings and Surface Devices

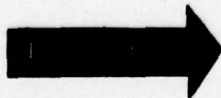
Volume V, Harmonic Analyses of Hub Wake

Volume VI, One-Third Octave Band Spectrograms of Wake Single Film Data

- A — Buildup to Baseline
- B — Basic Configuration Wake Exploration
- C — Hubcaps and Air Ejectors

Volume VII, Frequency Analyses of Wake Split-Film Data

- A — Buildup to Baseline
- B — Basic Configuration Wake Explorations
- C — Solid Hubcaps



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- D - Open Hubcaps
- E - Air Ejectors
- F - Air Ejectors With Hubcaps; Wings
- G - Fairings and Surface Devices

Volume VIII, Frequency Analyses of Wake Single Film Data

- A - Buildup to Baseline
- B - Basic Configuration Wake Exploration
- C - Hubcaps and Air Ejectors

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INTRODUCTION

Volume VII presents an array of machine plotted graphs of wake angle and velocity versus frequency in the band from 4 to 240 Hz derived from the split film transducers. This encompasses data in the spectrum through 10 times rotor speed which is 1433 RPM or 23.88 Hz.

The graphs showing wake frequency spectra are sequenced in the same order as the Outline of Wake Investigations (Table I). These graphs are distributed among Volumes VII-A through VII-G by the major categories of Table I in the following arrangement:

- Volume VII-A - Build-up to Baseline
- Volume VII-B - Basic Configuration
- Volume VII-C - Effect of Hub Caps Sections 1 & 2
- Volume VII-D - Effect of Hub Caps Sections 3 & 4
- Volume VII-E - Effect of Hub Caps Section 5 and
Effect of Air Ejectors
- Volume VII-F - Air Ejectors with Open Hub Caps and
Effect of Wings and Misc. Section 1
- Volume VII-G - Effect of Wings and Misc. Sections 2 & 3

The Table I outline and other material is included for reference and as context to the work of each sub-volume. Table 2, the List of Test Runs, arranges the runs in numerical order and gives pertinent text parameters.

The Index of Rake Positions, Table 3, lists the hot film transducer rake positions in the model coordinate system for each run and its test points. The main feature of Table 3 is the indexing of the test point number to the model water line station and butt line as it varied from run to run. The table groups the runs as they shared the indexing correspondence of point with position. It is emphasized that the runs in a group do not necessarily all share the same number of test points but they do have same correspondence within their respective ranges of test points.

The orientation of the rake is shown pictorially in Figures 1 through 6 for the various test runs. Figure 7 presents a scaled drawing of the model with reference to the three-axis coordinate system.

TABLE 1
OUTLINE OF WAKE INVESTIGATIONS

Description	Configuration Code	Run No.	Base-line
<u>Build-up to Baseline</u>			
1. Nacelles removed	$K_{13}+H_1-N$	149	150
2. Blades off, rotating hub	$K_{13}-M+H_{1.0}$	160	156
3. " " , non-rotating hub	$K_{13}-M+H_{1.0}$	158	156
4. " " , hub off	$K_{13}-M-H_{1.0}$	159	156
<u>Basic Configuration</u>			
1. <u>Wake Explorations near Empennage</u>			
(a) 15" Long. + traverse at T/R C.L.	K_{11}	111	---
(b) 9" Vert. + " above T/R "	"	112	---
(c) 2" " " in vortex	"	113	---
(d) 8" " " (continue 112)	"	114	---
(e) 13" " " behind stab.	"	115	---
(f) Lateral traverse, left stab. (One T.P. only)	"	116	---
(g) Same continued	"	117	---
(h) Same continued (One T.P. only)	"	118	---
(i) Lateral traverse right stab.	"	119	---
(j) T/R effect on wake	$K_{11}+T_2^0$	121	115
2. <u>Climb/Descent Studies</u>			
(a) Climb 900 FPM	K_{11}	135	---
(b) Descent 800 FPM	"	136	---
<u>Effect Of Hub Caps</u>			
1. <u>Solid Caps on Canister</u>			
(a) 7.6" diam. 2.17" ht. soft Pitch Arms	$K_{11}-H_{1.0}+H_{1.2}$	137	136
(b) 7.6" diam. 2.17" ht. stiff Pitch Arms	$K_{13}+H_{1.2}$	153	156
(b) 7.6" diam. 2.45" ht. flt. test config.	$K_{13}+H_{1.2.1}+I_1$ $+E_{1.0}$	207	188

TABLE 1 (CONTINUED)

OUTLINE OF WAKE INVESTIGATIONS

Description	Configuration Code*	Run No.	Base-line
<u>Effect of Hub Caps (Continued)</u>			
2. <u>Solid Caps Raised Above Canister</u>			
(a) 7.6" diam. 2.45" ht. 70" depth, .55 gap	H _{1.2.2} +I ₁ +E _{1.0}	208	188
(b) 10.0" diam. 3.25" ht. 1.55" depth, .50" gap	H _{1.8.1} +I ₁ +E _{1.0}	189	188
(c) 10.0" diam. 4.125" ht. 2.05" depth, .875" gap	H _{1.8.2} +I ₁ +E _{1.0}	190	188
(d) Repeat of 189	" " "	210	188
3. <u>Open Caps Without Underbody</u>			
(a) 10.0" diam. 1.25" gap, blades	H _{1.0.2} +I ₁ +E _{1.0}	193	188/166
(b) " " " gap, no blades	H _{1.0.1} -M	166	158
(c) " " 2.05" gap, blades	H _{1.14.1} +I ₁ +E _{1.0}	211	188
(d) " " 1.75" gap, no blades	H _{1.0.1} -M	165	158
(e) " " 1.87" gap, blades	H _{1.0.3} +I ₁ +E _{1.0}	191	188
(f) 16" diam. 2.00" gap, blades	H _{1.7.1}	168	156/167
(g) " " " gap, no blades	H _{1.7.1} -M	167	158
(h) " " 4.00" gap, blades	H _{1.7.2}	169	156
4. <u>Open Caps with Underbody</u>			
(a) 7.6" diam. 1.25" gap	H _{1.11.1} +I ₂ +E _{1.0}	194	188
(b) " " " " "	H _{1.11.1} +I ₂ +E _{4.0}	198	188
(c) " " " " center post	H _{1.11.2} +I ₂	202	194
(d) 10.0" diam. .5" gap, no blades	H _{1.5.1} -M	164	158
(e) " " 1.25" gap, no blades	H _{1.5.2} -M	161	158
(f) " " 2.0" gap, no blades	H _{1.5.4} -M	163	158
(g) " " 4.0" gap, no blades	H _{1.5.3} -M	162	158
(h) " " 1.25" gap	H _{1.5.2}	154	156/161
*Basic Code is K13.			

TABLE 1 (CONTINUED)

OUTLINE OF WAKE INVESTIGATIONS

Description	Configuration Code*	Run No.	Base-line
<u>5. Miscellaneous Hub Covers</u>			
(a) Hub fairing 16" diam.	H _{1.3}	151	150
(b) Wham-O-Frisbee 10" diam.	H _{1.9.0} +E _{1.2}	182	181
(c) Fab. glass Frisbee 16" diam.	H _{1.9.1} +E _{1.2}	183	181
<u>Effect of Air Ejectors</u>			
1. Basic system no blowing	H _{1.0} +E _{1.0}	172	156
2. " " 40 psi	" "	173	156/172
3. " " 150 psi	" "	174	156/172
4. Wide chord shroud 40 psi	H _{1.0} +E _{2.5.1}	175	156/173
5. Wide " " 150 psi	" "	176	156/174
6. W/C shroud w. lip 40 psi	H _{1.0} +E _{3.5.2}	184	156/173
7. Same Contoured Parallel 150 psi	H _{1.0} +E _{3.5.4}	187	156/174
8. Bifurcated duct 0 psi	H _{1.0} +E _{5.0}	203	156
9. " " 40 psi	" "	204	156/203
10. " " 150 psi	" "	205	156/203
<u>Air Ejectors with Open Hub Caps with Underbodies</u>			
1. 7.6" diam. 1.25" gap, 0 psi	H _{1.11.1} +I ₂ +E _{1.0}	194	188/172
2. " " " " 20 psi	" " "	195	188
3. " " " " 40 psi	" " "	196	188/173
4. " " " " 150 psi	" " "	197	188/174
5. " " " " 0 psi	H _{1.11.1} +I ₂ +E _{4.0}	198	188/194
6. " " " " 40 psi	" " "	199	188/196
7. " " " " 150 psi	" " "	200	188/196
8. Same with center post	H _{1.11.2} +I ₂ +E _{4.6}	201	188/200
9. 10.0" diam. 2.0" gap wide ch'd. shroud (150 psi)	H _{1.5.4} +E _{2.5.1}	177	156/176
<u>Effect of Wings and Misc.</u>			
1. Wings			
(a) Nacelle-mounted stub wing	H _{1.0} +W _{1.0} +E _{1.1}	178	181
(b) Single slotted flapped wing	H _{1.0} +W _{3.0} +E _{1.0}	180	181
(c) Double slotted flapped wing	H _{1.0} +W _{2.0} +E _{1.0}	179	181
(d) Boom-mounted stub wing	H _{1.0} +W _{4.0}	186	156
*Basic Code is K13.			

TABLE 1 (CONTINUED)

OUTLINE OF WAKE INVESTIGATIONS

Description	Configuration Code*	Run No.	Base-line
2. Crown Fairings			
(a) Flat top behind shaft	$K_{11}+D_1$	140	138
(b) Round top behind shaft	$K_{11}+D_2$	141	138
(c) Extended flat top fairing	H_1+D_4	170	156
(d) Flat top + 16" cap, 4" gap	$H_{1.7.2}+D_4$	171	170
(e) Forward fairing/nacelle fairing	$P_{1.0}$	152	156
3. Surface Devices			
(a) Vortex generators	$K_{11}+VG_{2.1}$	139	138
(b) Guidevane between nacelles	$K_{11}+FV_1$	142	138
(c) Longitudinal strakes	$H_{1.5.3}+S_4$	155	156
(d) 14% porosity spoiler	$K_{11}+X_1$	143	138
*Basic Code is K13 unless noted otherwise.			

TABLE 2
LIST OF TEST RUNS
BASIC INVESTIGATIONS OF THE HUB WAKE

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. pcf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
111	K ₁₁ /15" Long. wake traverse at TR center line	80	1433/0	8	6.0	-2.0	∞	Off
112	" /9" Vert. wake traverse above TR center line	"	"	"	"	"	"	"
113	" /2" Vert traverse through MR vortex	"	"	"	"	"	"	"
114	" /8" Vert. traverse below TR center line	"	"	"	"	"	"	"
115	" /13" Vert. traverse behind stabilizer	"	"	"	"	"	"	"
116	" /Lateral traverse - left stabilizer	"	"	"	"	"	"	"
117	" /116 continued	"	"	"	"	"	"	"
118	" /116 continued	"	"	"	"	"	"	"
119	" /Lateral traverse - right stabilizer	"	"	"	"	"	"	"
121	K ₁₁ +T ₂ /Effect of tail rotor flow on wake	"	1433/4500	"	"	"	"	On
135	K ₁₁ /Wake in 900 fpm climb	"	"	"	-6.0	-4.5	"	Off
136	" /Wake in 800 fpm descent	"	"	"	6.0	+2.0	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
137	K ₁₁ -H _{1.0} +H _{1.2} /Effect of 7.6 inch diam. solid hub cap	80	1433/0	8	6	-3.8	∞	Off
138	K ₁₁ /Repeat of base run	"	"	"	"	"	"	"
139	K ₁₁ +VG _{2.1} /Effect of vortex generators on aft crown	"	"	"	"	"	"	"
140	K ₁₁ +D ₁ /Flat-topped "doghouse" fairing on aft crown	"	"	"	"	"	"	"
141	K ₁₁ +D ₂ /Rounded-top fairing	"	"	"	"	"	"	"
142	K ₁₁ +FV ₁ /Deflection vane on crown between nacelles	"	"	"	"	"	"	"
143	K ₁₁ +X ₁ /Variable porosity spoiler	"	"	"	"	"	"	"
149	K ₁₃ +H ₁ -N ₁ /Effect of nacelles off also add stiff pitch arms (K ₁₃)	60	1075/0	4.5	"	"	"	"
150	K ₁₃ +H ₁ /60 knot baseline	"	"	"	"	"	"	"
151	K ₁₃ +H _{1.3} /16 inch diam. helmet fairing	"	"	"	"	"	"	"
152	K ₁₃ +P _{1.0} /Pylon and intake fairings	80	1433/0	8	"	"	"	"
153	K ₁₃ +H _{1.2} /Repeat 137 with K ₁₃ pitch arms	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT.	TAIL ROTOR
					α°	ψ°		
154	K ₁₃ +H _{1.5.2/10} " open hub cap, 7" underbody, 1.25" gap	80	1433/0	8	6	-3.8	∞	Off
155	K ₁₃ +H _{1.5.2} +S ₄ /Same as 154 except strakes on aft crown	"	"	"	"	"	"	"
156	K ₁₃ +H _{1.0} /Baseline with K ₁₃ , i.e., stiff pitch arms	"	"	"	"	"	"	"
158	K ₁₃ -M+H _{1.0} /Wake studies with blades off, hub not rotating	"	0/0	"	"	"	"	"
159	K ₁₃ -M-H _{1.0} /Wake studies with hub off	"	"	"	"	"	"	"
160	K ₁₃ -M+H _{1.0} /Same as 158 except hub is rotating	"	1433/0	"	"	"	"	"
161	K ₁₃ -M+H _{1.5.2} /Repeat of 154 without blades	"	0/0	"	"	"	"	"
162	K ₁₃ -M+H _{1.5.3} /Same as 161 except 4" gap	"	"	"	"	"	"	"
163	K ₁₃ -M+H _{1.5.4} /Same as 161 except 2" gap	"	"	"	"	"	"	"
164	K ₁₃ -M+H _{1.5.1} /Same as 161 except 0.5" gap	"	"	"	"	"	"	"
165	K ₁₃ -M+H _{1.0.1/10} " open hub cap, no underbody, same cap vert. position as Run 154	"	"	"	"	"	"	"
166	K ₁₃ -M+H _{1.0.2} /Same as 165 with cap lowered by 0.5"	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
167	K ₁₃ -M+H _{1.7.1} /16" open cap, no underbody, 2" gap	80	0/0	8	6	-3.8	∞	Off
168	K ₁₃ +H _{1.7.1} /Blades on, same cap config. as 167	"	1433/0	"	"	"	"	"
169	K ₁₃ +H _{1.7.2} /16" open cap, no underbody, 4" gap	"	"	"	"	"	"	"
170	K ₁₃ +H _{1.0} +D _{4.0} /Extended flat top fairing on aft crown	"	"	"	"	"	"	"
171	K ₁₃ +H _{1.7.2} +D _{4.0} /Same fairing as 170, same cap as 169	"	"	"	"	"	"	"
172	K ₁₃ +H _{1.0} +E _{1.0} (0psi)/Basic air ejector zero blowing baseline	"	"	"	"	"	"	"
173	K ₁₃ +H _{1.0} +E _{1.0} (40 psi)/Same as 172 with 40 psi supply	"	"	"	"	"	"	"
174	K ₁₃ +H _{1.0} +E _{1.0} (150 psi)/Same as 172 with 150 psi supply	"	"	"	"	"	"	"
175	K ₁₃ +H _{1.0} +E _{2.5.1} (40 psi)/Ejector with wide chord shroud at 40 psi	"	"	"	"	"	"	"
176	K ₁₃ +H _{1.0} +E _{2.5.1} (150 psi)/Same as 174 with 150 psi supply	"	"	"	"	"	"	"
177	K ₁₃ +H _{1.5} ⁴ +E _{2.5.1} (150 psi)/Same as 176 with 10" cap like 163	"	"	"	"	"	"	"
178	K ₁₃ +H _{1.0} +W _{1.0} +E _{1.1} (0 psi)/Nacelle mounted wing	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)

LIST OF TEST RUNS

EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	V _{TUN} KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
179	K ₁₃ +H _{1.0} +W _{2.0} +E _{1.0} (0 psi)/Double slotted flapped wing	80	1433/0	8	6	-3.8	∞	Off
180	K ₁₃ +H _{1.0} +W _{3.0} +E _{1.0} (0 psi)/Single slotted flapped wing	"	"	"	"	"	"	"
181	K ₁₃ +H _{1.0} +E _{1.2} (0 psi)/Baseline with ejector tube moved aft	"	"	"	"	"	"	"
182	K ₁₃ +H _{1.9.0} +E _{1.2} (0 psi)/Standard 10" frisbee	"	"	"	"	"	"	"
183	K ₁₃ +H _{1.9.1} +E _{1.2} (0 psi)/16" fabricated frisbee	"	"	"	"	"	"	"
184	K ₁₃ +H _{1.0} +E _{3.5.2} (40 psi)/Wide chord with lip at 40 psi	"	"	"	"	"	"	"
185	K ₁₃ +H _{1.0} +E _{3.5.2} (150 psi)/Same as 184 with 150 psi air	"	"	"	"	"	"	"
186	K ₁₃ +H _{1.0} +W _{4.0} /Boom mounted stub wing	"	"	"	"	"	"	"
187	K ₁₃ +H _{1.0} +E _{3.5.4} (150 psi)/Like 185 with modified shroud	"	"	"	"	"	"	"
188	K ₁₃ +H _{1.0} +I ₁ +E _{1.0} (0 psi)/Baseline with I ₁ instr. ring	"	"	"	"	"	"	"
189	K ₁₃ +H _{1.8.1} +I ₁ +E _{1.0} (0 psi)/Solid cap, 10" diam. 3.25" height	"	"	"	"	"	"	"
190	K ₁₃ +H _{1.8.2} +I ₁ +E _{1.0} (0 psi)/Same as 190 except + 4.12" height	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
191	K13+H1.0.2+I1+E1.0 (0 psi)/10" cap, no underbody, 1.87" gap	80	1433/0	8	6	-3.8	∞	Off
193	K13+H1.0.2+I1+E1.0 (0 psi)/10" cap, no underbody, 1.25" gap	"	"	"	"	"	"	"
194	K13+H1.11.1+I2+E1.0 (0 psi)/7.6" cap, underbody, 1.25" gap	"	"	"	"	"	"	"
195	K13+H1.11.1+I2+E1.0 (20 psi)/Same as 194 with 20 psi air	"	"	"	"	"	"	"
196	K13+H1.11.1+I2+E1.0 (40 psi)/Same as 194 with 40 psi air	"	"	"	"	"	"	"
197	K13+H1.11.1+I2+E1.0 (150 psi)/Same as 194 with 150 psi air	"	"	"	"	"	"	"
198	K13+H1.11.1+I2+E4.0 (0 psi)/Same as 194 except blowing tube 2" aft	"	"	"	"	"	"	"
199	K13+H1.11.1+I2+E4.0 (40 psi)/Same as 198 with 40 psi air	"	"	"	"	"	"	"
200	K13+H1.11.1+I2+E4.0 (150 psi)/Same as 198 with 150 psi air	"	"	"	"	"	"	"
201	K13+H1.11.2+I2+E4.0 (150 psi)/Same as 200 except center support cap	"	"	"	"	"	"	"
202	K13+H1.11.2+I2/Baseline with I2 and no blowing tube	"	"	"	"	"	"	"
203	K13+H1.0+E5.0 (0 psi)/Bifurcated air duct baseline	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

[illegible]

TABLE 3
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
111	20	53.5	103.1	-7.25	1
	21	"	"	"	
	22	"	105.0	"	
	24	"	107.0	"	
	26	"	109.0	"	
	28	"	111.0	"	
	30	"	112.9	"	
	32	"	114.9	"	
	34	"	116.9	"	
	36	"	118.9	"	
112	2	48.9	107.3	-7.25	1
	4	50.8	"	"	
	6	52.7	103.3	"	
	8	54.5	"	"	
	10	56.2	"	"	
	12	57.2	"	"	
113	2	51.7	103.3	-3.25	1
	4	52.3	"	"	
	6	52.8	"	"	
	8	53.3	"	"	
	10	53.9	"	"	
	11	53.3	"	"	
114	2	44.5	103.0	-3.25	1
	4	46.4	"	"	
	6	48.2	"	"	
	8	50.0	"	"	
	10	51.9	"	"	
115	3	52.9	124.7	-3.25	1
	4	52.0	"	"	
	6	50.0	"	"	
	9	48.0	"	"	
	10	46.0	"	"	
	12	44.1	"	"	
	14	42.1	"	"	
	16	53.0	"	"	
	18	54.0	"	"	
	20	55.0	"	"	

TABLE 3 (CONTINUED)
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
116	7	36.9	100.5	-17.5	1
117	2 4 6 8 10	37.6 " 37.3 " "	100.5 " 99.6 " "	-16.0 -14.0 -12.0 -10.0 - 8.0	1
118	2	37.6	100.5	- 6.0	1
119	2 5 8 9 14 16 20 25	37.3 " " " " " 51.5 52.3	99.6 " " " " " 102.5 101.7	+ 6.0 8 10 " 14 16 17.5 -17.5	1
121	3 4 6 8 10	62.9 53.5 50.1 46.0 42.1	129.0 " " " "	+ 5.7 " " " "	2
135	2 4 6 8 10 12 14	56.9 54.5 52.5 50.5 48.5 46.5 44.5	106.3 " " " " " "	- 5.7 " " " " " "	3
136	2 4 6 8 10 12 14 17 18 19	56.5 54.5 52.5 50.6 48.5 46.5 44.5 37.1 39.0 41.0	104.0 " " " " " " " " "	- 8.0 " " " " " " " " "	4

TABLE 3 (CONTINUED)
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
137	3	38.7	98.4	- 8.0	5
	5	39.9	"	"	
	7	42.0	100.5	"	
	9	44.0	"	"	
	11	46.0	103.6	"	
	13	48.0	"	"	
	15	50.0	"	"	
	17	52.0	"	"	
	19	54.0	"	"	
138-41, 143	2	38.8	98.4	- 8.0	5
	3	40.0	"	"	
	4	42.0	100.5	"	
	5	44.0	"	"	
	6	46.0	103.6	"	
	7	48.0	"	"	
	8	50.0	"	"	
	9	52.0	"	"	
	10	54.0	"	"	
142	7	37.8	98.4	- 8.0	5
	8	"	"	"	
	9	40.2	"	"	
	10	42.0	100.5	"	
	11	44.0	"	"	
	12	46.0	103.6	"	
	13	48.0	"	"	
	14	50.0	"	"	
	15	52.0	"	"	
	16	54.0	"	"	
	17	56.8	"	"	

TABLE 3 (CONTINUED)
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
149-151	2	38.8	98.5	- 8.0	5
	3	40.0	"	"	
	4	42.0	100.6	"	
	5	44.0	"	"	
	6	46.0	103.5	"	
	7	48.0	"	"	
	8	50.0	"	"	
	9	52.0	"	"	
	10	54.0	"	"	
152-6, 158	2	42.9	97.9	0.0	6
161-4, 166	3	44.9	"	"	
167, 169-71	4	46.9	100.6	"	
175, 177-9	5	48.9	"	"	
180, 182, 184	6	50.9	104.6	"	
186-8, 190	7	52.9	"	"	
191, 193, 194	8	54.9	"	"	
196, 198, 201	9	56.9	"	"	
204, 207, 208					
211					
159	1	54.9	104.6	0.0	6
	2	52.9	"	"	
	3	50.7	"	"	
	4	48.6	100.6	"	
	5	46.7	"	"	
160, 203	5	42.9	97.9	0.0	6
	6	44.9	"	"	
	7	46.9	100.6	"	
	8	48.9	"	"	
	9	50.9	104.6	"	
	10	52.9	"	"	
	11	54.9	"	"	
165	3	44.9	97.9	0.0	6
	4	42.9	"	"	
	5	46.9	100.6	"	
	6	48.9	"	"	
	7	50.9	104.6	"	
	8	52.9	"	"	

TABLE 3 (CONTINUED)
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
168, 183	4	42.9	97.9	0.0	6
	5	44.9	"	"	
	6	46.9	100.6	"	
	7	48.9	"	"	
	8	50.9	104.6	"	
	9	52.9	"	"	
	10	54.9	"	"	
172	3	42.9	97.9	0.0	6
	4	44.9	"	"	
	6	44.9	"	"	
	7	46.9	100.6	"	
	8	48.9	"	"	
	9	50.9	104.6	"	
	10	52.9	"	"	
173, 174, 176 185, 195, 197 199, 200, 205 210	1	42.9	97.9	0.0	6
	2	44.9	"	"	
	3	46.9	100.6	"	
	4	48.9	"	"	
	5	50.9	104.6	"	
	6	52.9	"	"	
	7	54.9	"	"	
181	2	42.9	97.9	0.0	6
	3	44.9	"	"	
	4	46.9	100.6	"	
	5	48.9	"	"	
	6	50.9	104.6	"	
	7	52.9	"	"	
	9	54.9	"	"	
	10	"	"	"	
	11	"	"	"	
	12	"	"	"	
	13	42.9	97.9	"	

[illegible]

RUN 121

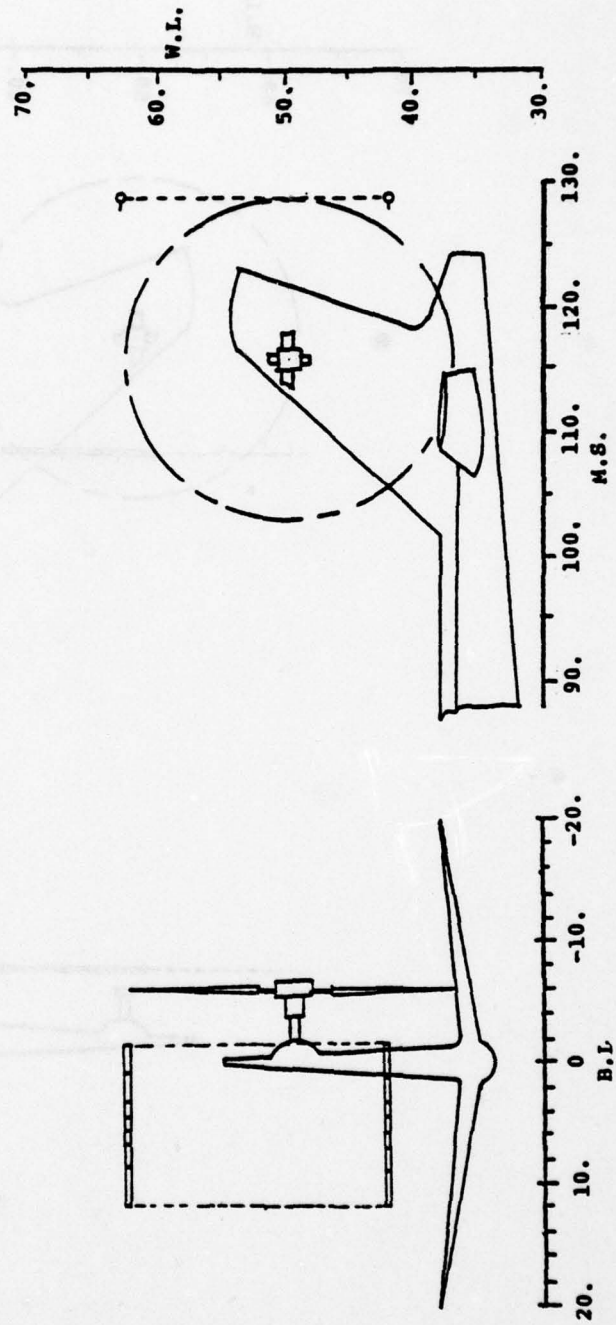


FIGURE 2 -HOT FILM RAKE LOCATIONS

RUN 135

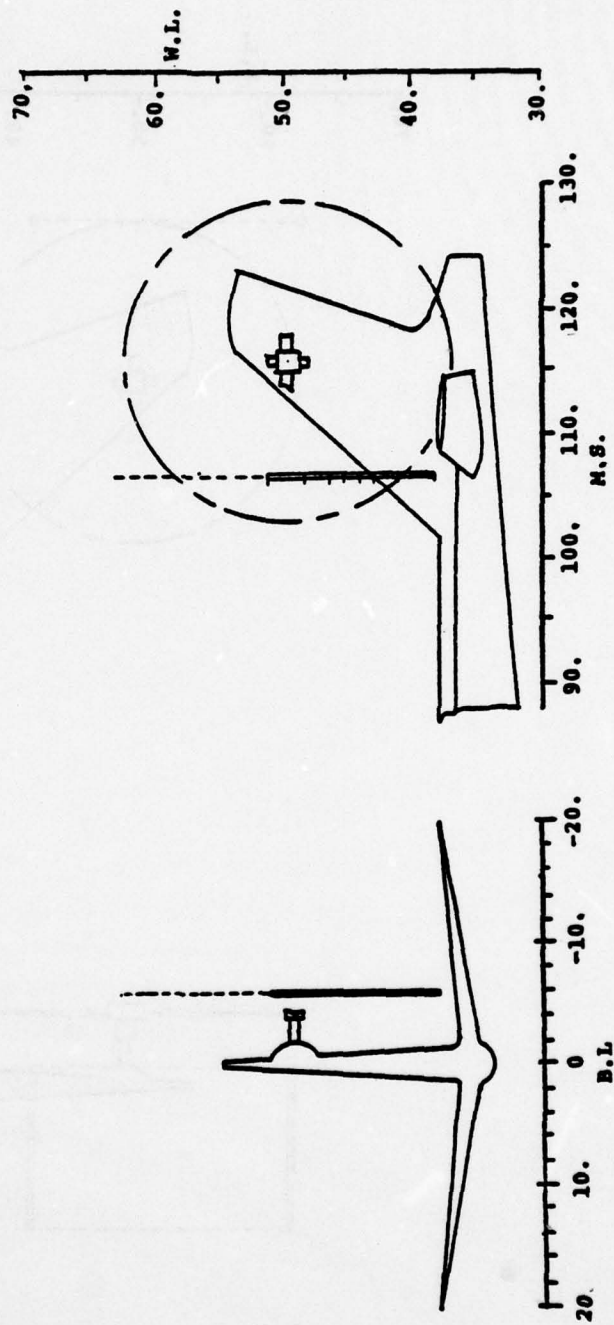


FIGURE 3 -HOT FILM RAKE LOCATIONS

RUN 136

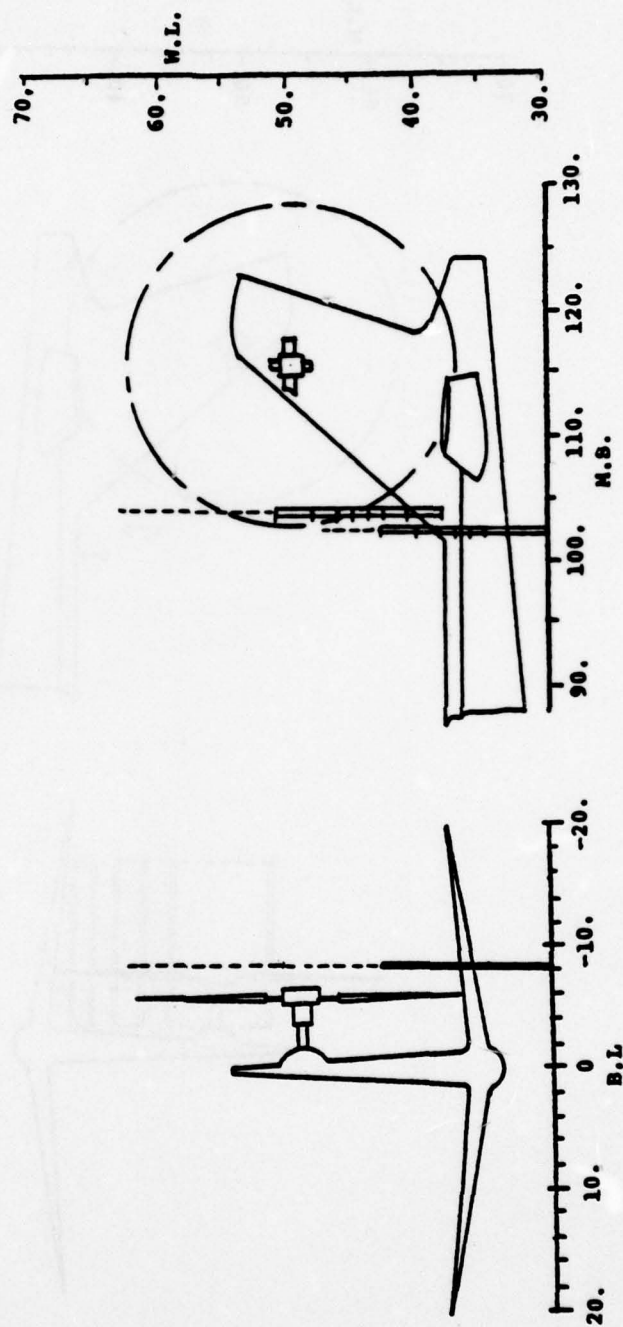


FIGURE 4 -HOT FILM RAKE LOCATIONS

RUN 137, 138, 139, 140, 141, 142,
143, 148, 149, 150, 151

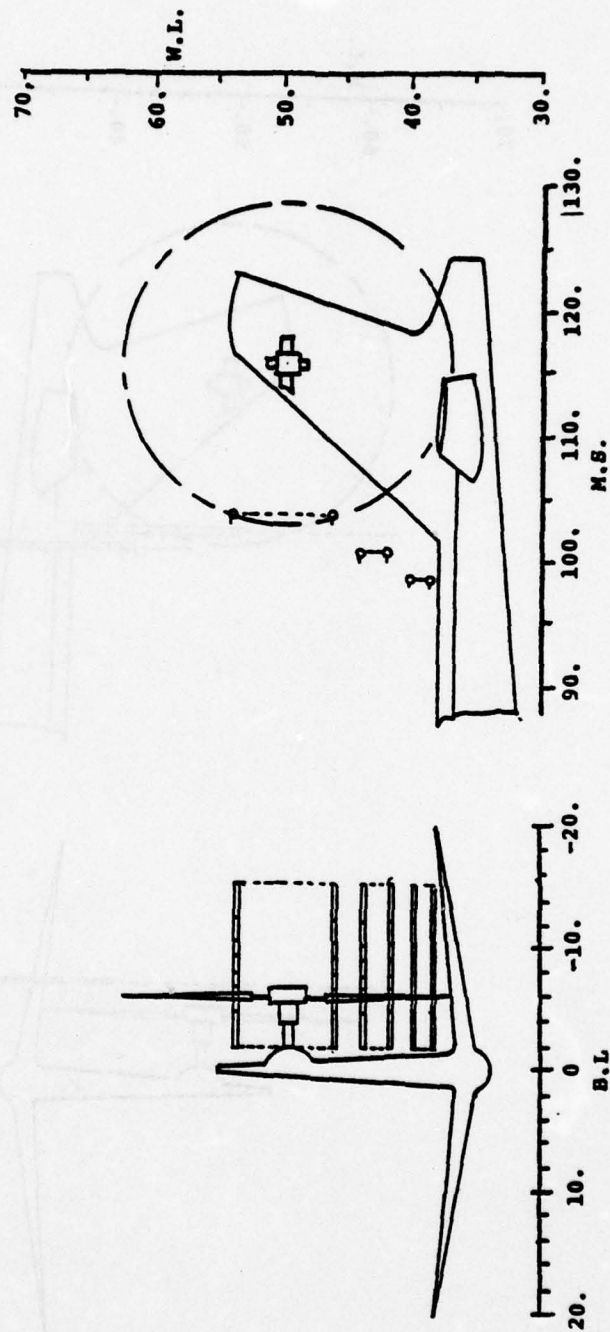


FIGURE 5 -HOT FILM RAKE LOCATIONS

RUN 152-156, 158-211

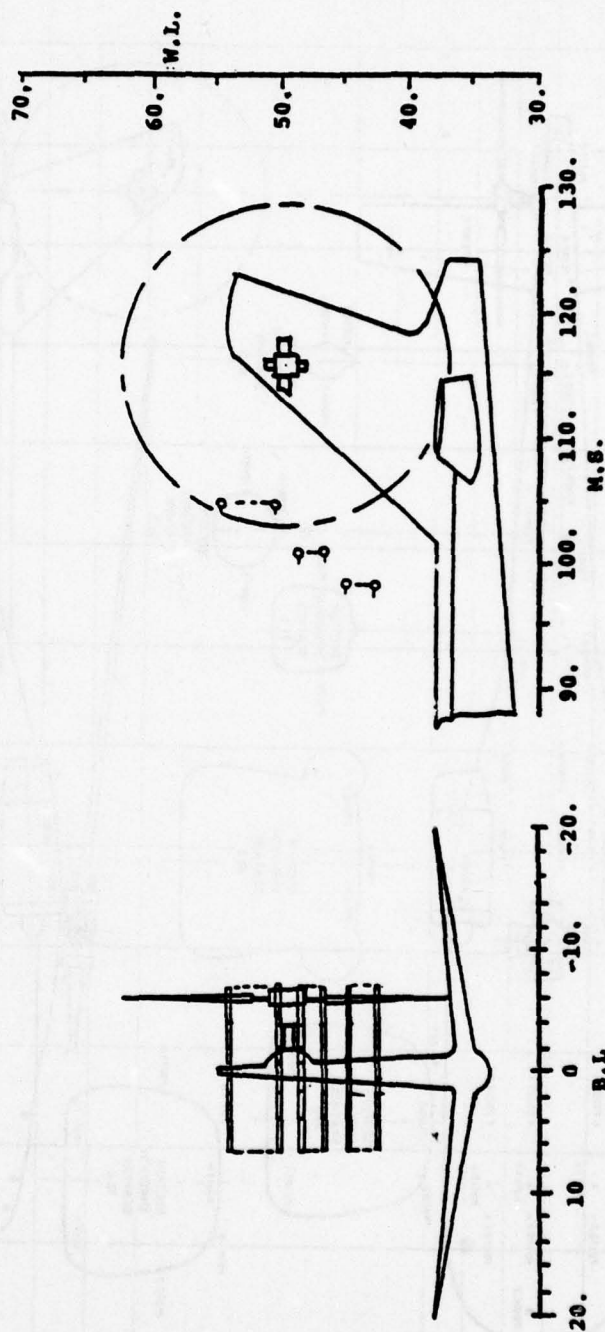


FIGURE 6 -HOT FILM RAKE LOCATIONS

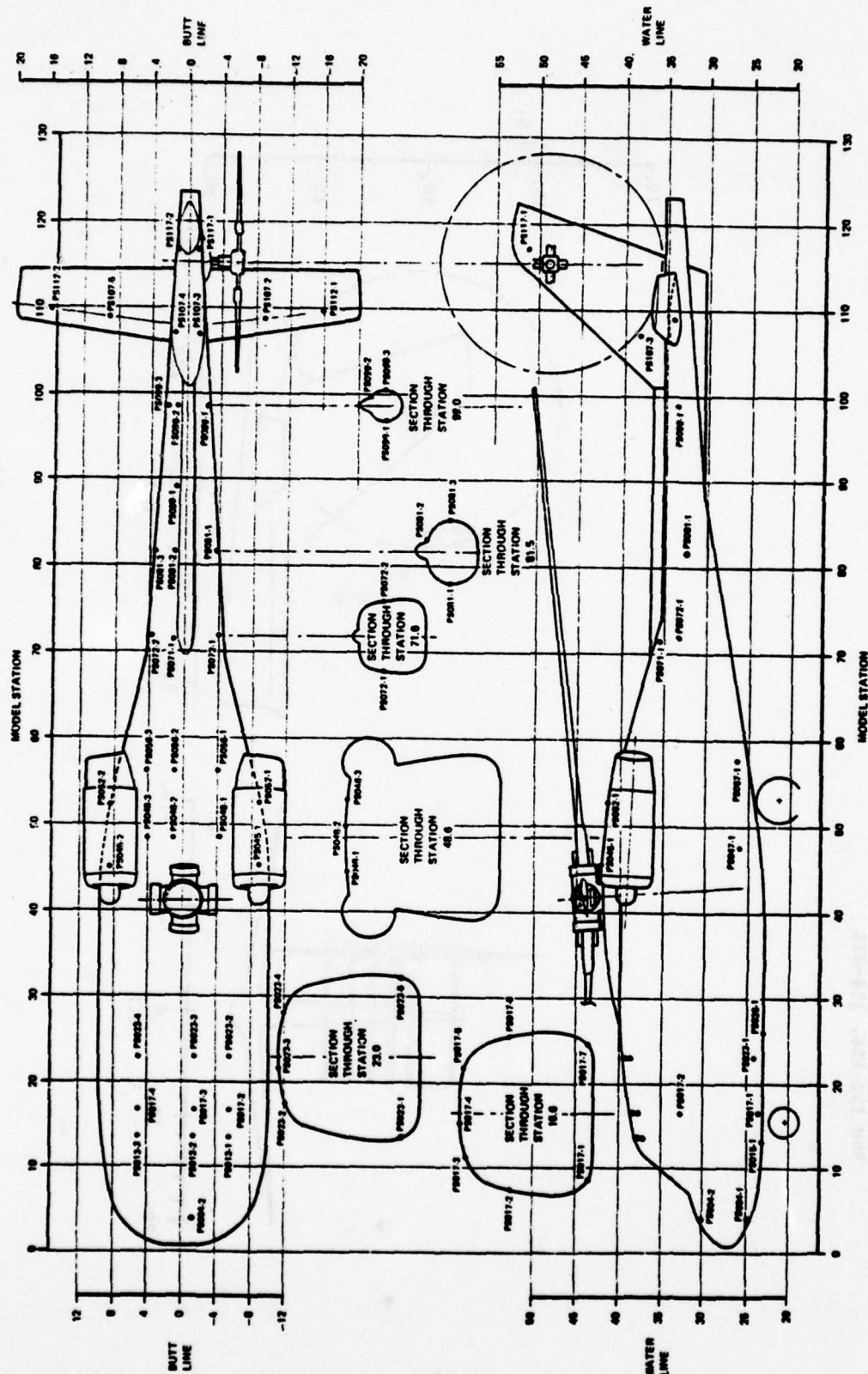
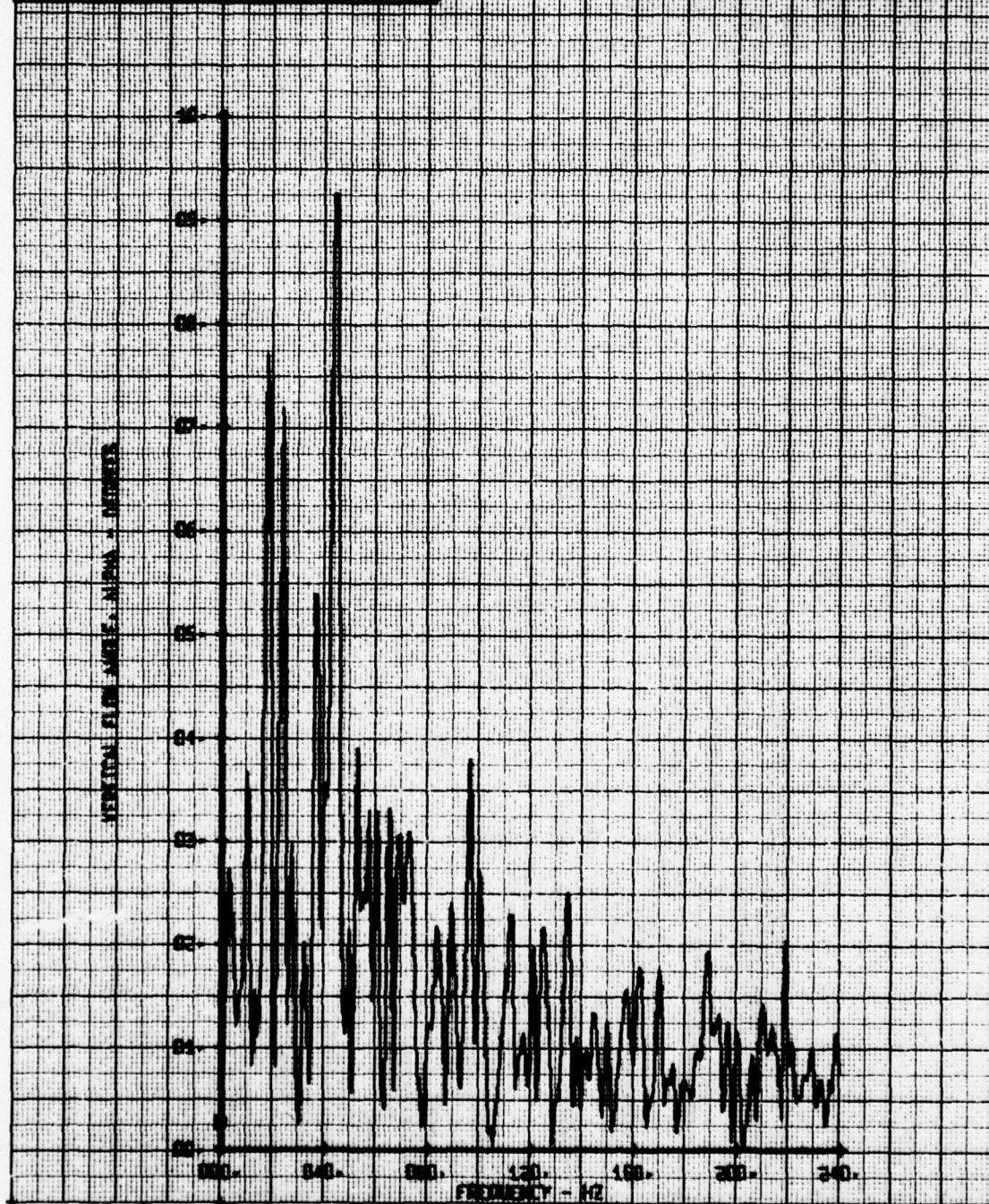


FIGURE 7 -1/4.85 SCALE MODEL GEOMETRY AND
SURFACE PRESSURE TRANSDUCER LOCATIONS

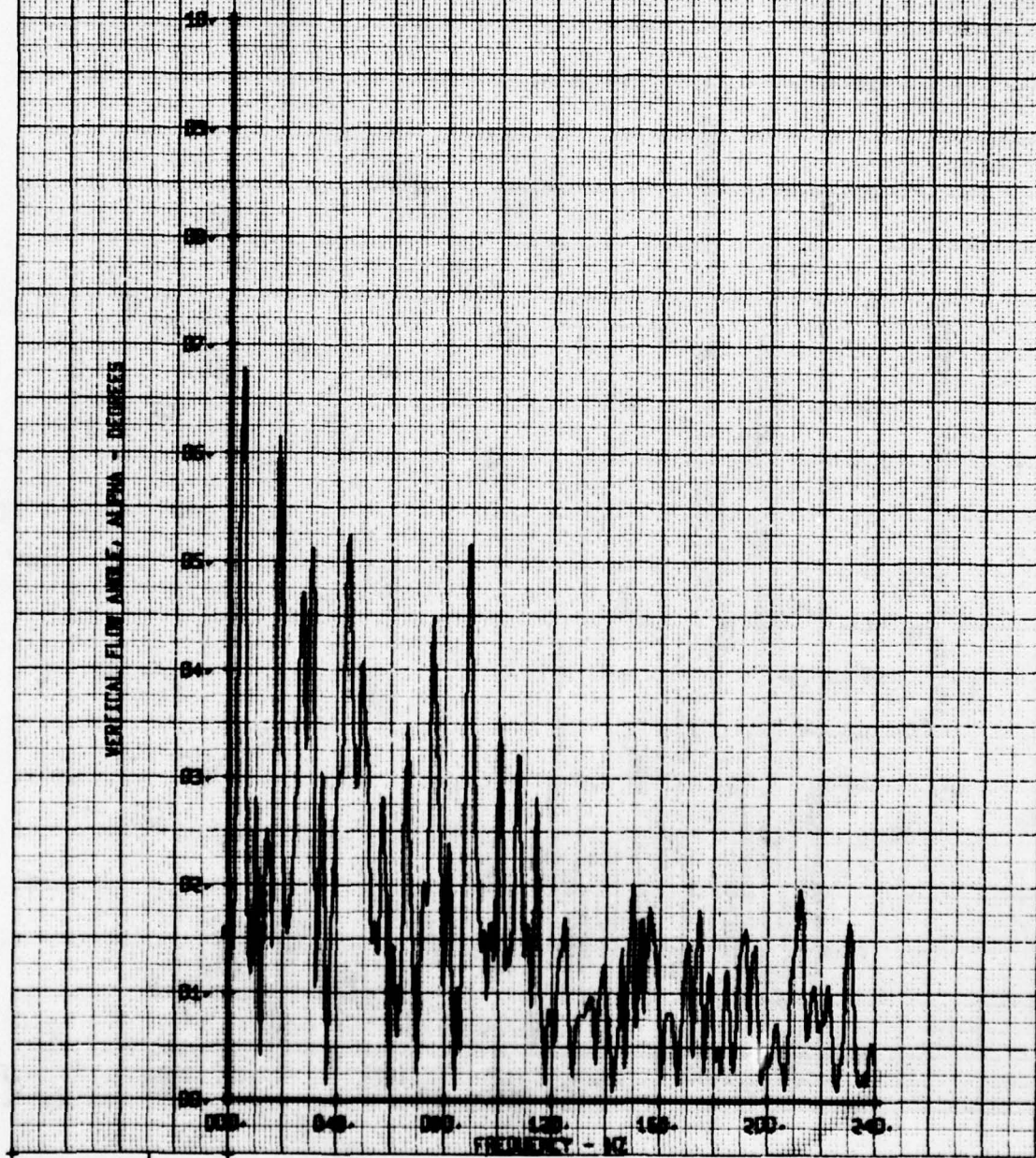
RBT FILM WIRE FREQUENCY ANALYSIS
 ROLL ID: 4-7-001A-2-1711- RBT P-A-
 RUN 127 OF 3

LEGEND
 CH PARAMETER
 65 ALPH



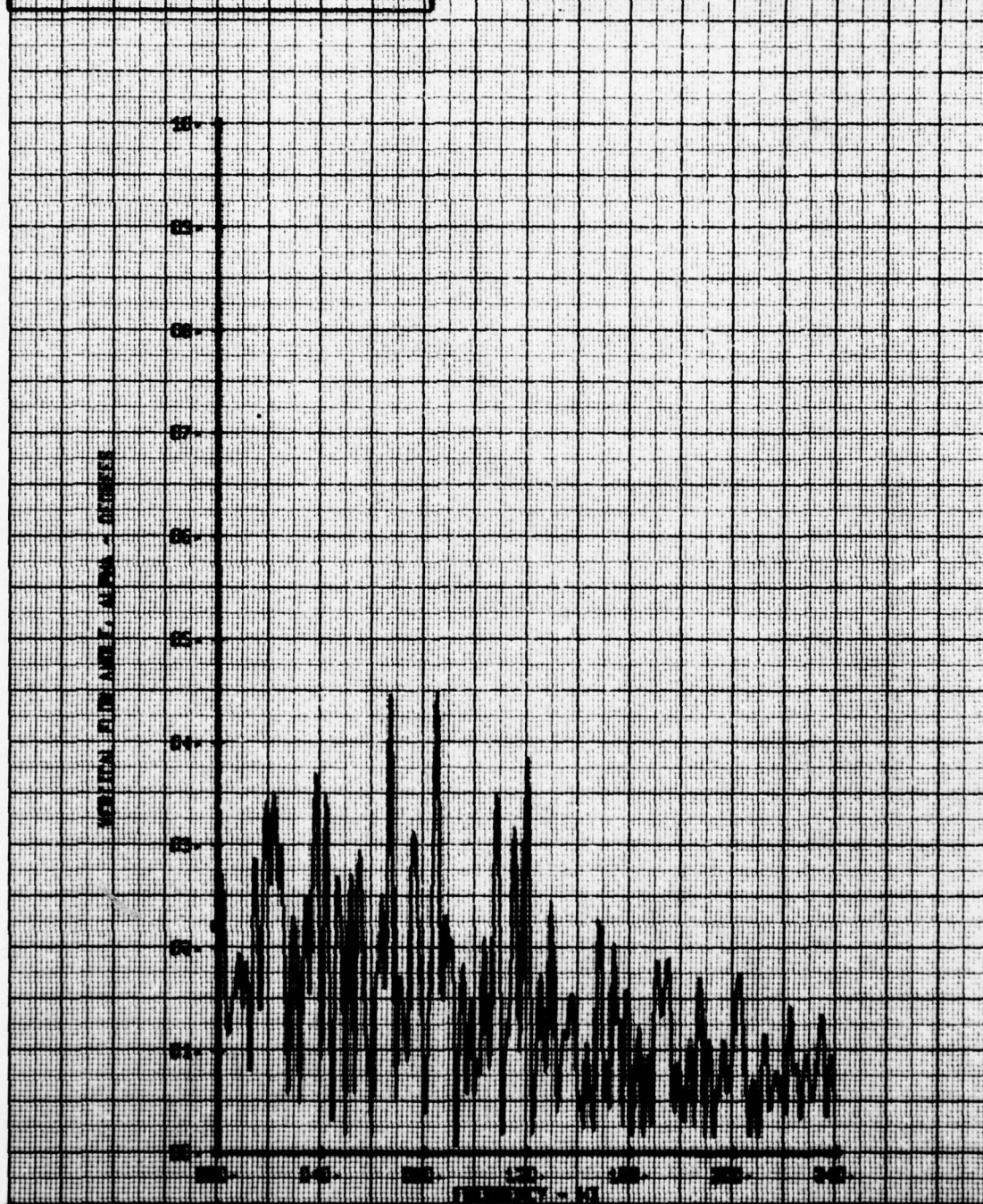
NOT FILM WAVE FREQUENCY ANALYSIS
SOL TO CAP-7.001A. 2-12-61. SCET P.A.
RM 132 TP 5

LEGEND
CH PARAMETER
DS ALPHA



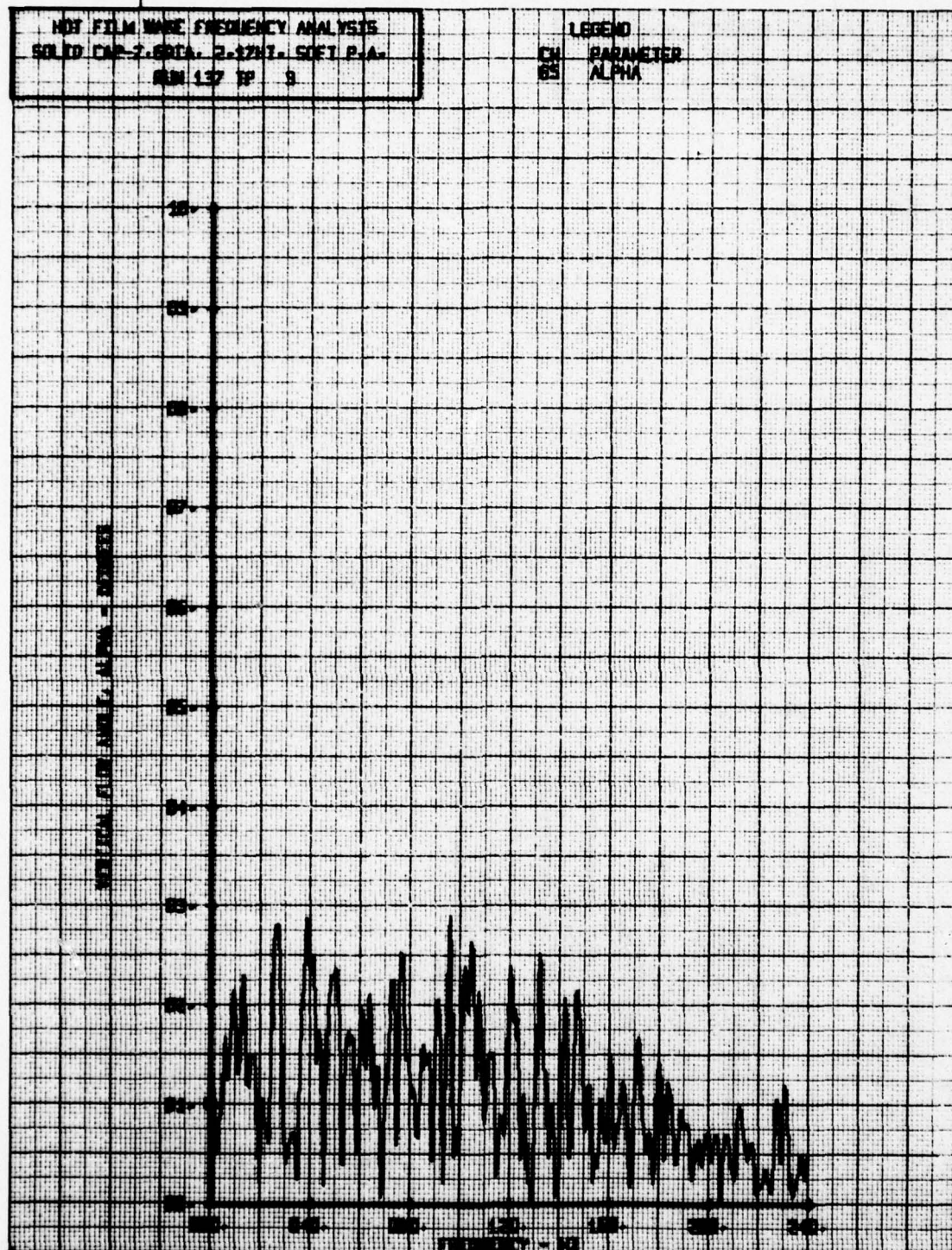
HOT FILM WAKE FREQUENCY ANALYSIS
 SOLID CAP-7.60TA, 2.12HT, 50ET P.A.
 RUN 137 IP 7

LEGEND
 CH PARAMETER
 65 ALPHA



NOI FILM WAVE FREQUENCY ANALYSIS
SOLID CAP-2.601A. 2.17H1. SGT P.A.
RAN 137 TP 9

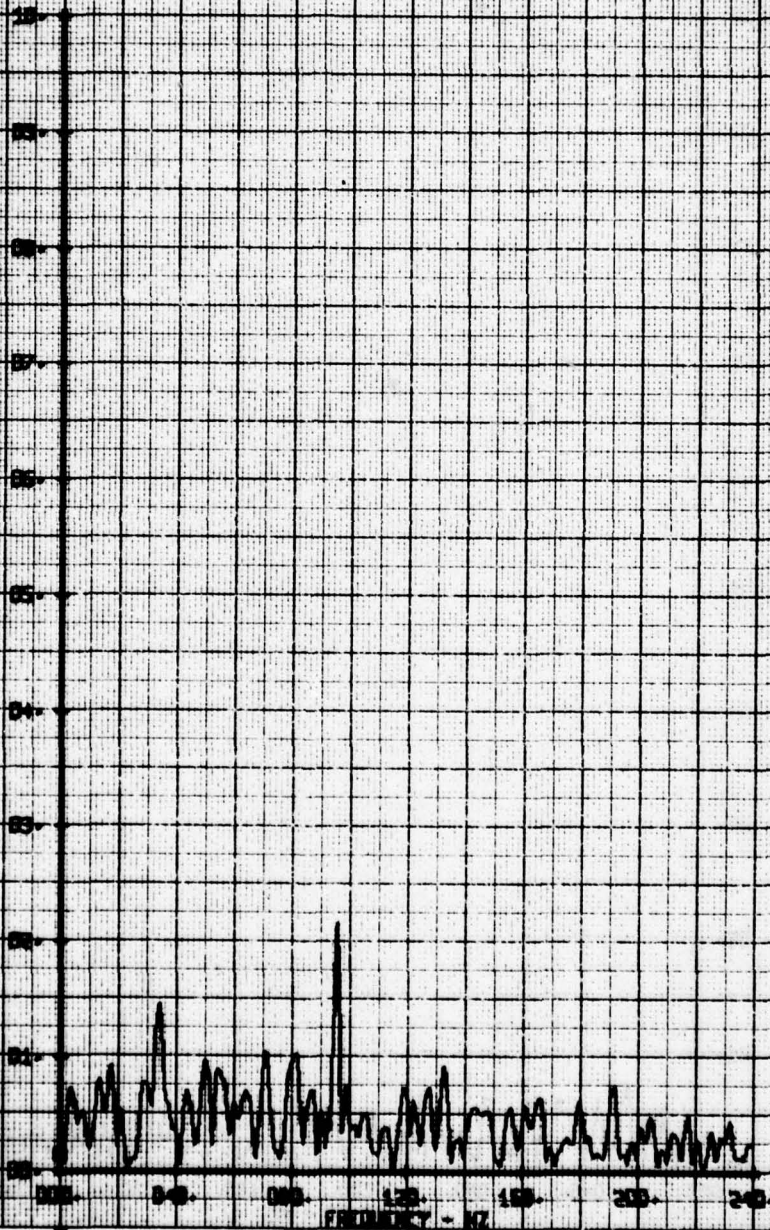
LEGEND
CH PARAMETER
65 ALPHA



HOT FILM WARE FREQUENCY ANALYSIS
 SOLID CAP-7.00CA. 3.1241. SEET P.A.
 RUN 137 12 13

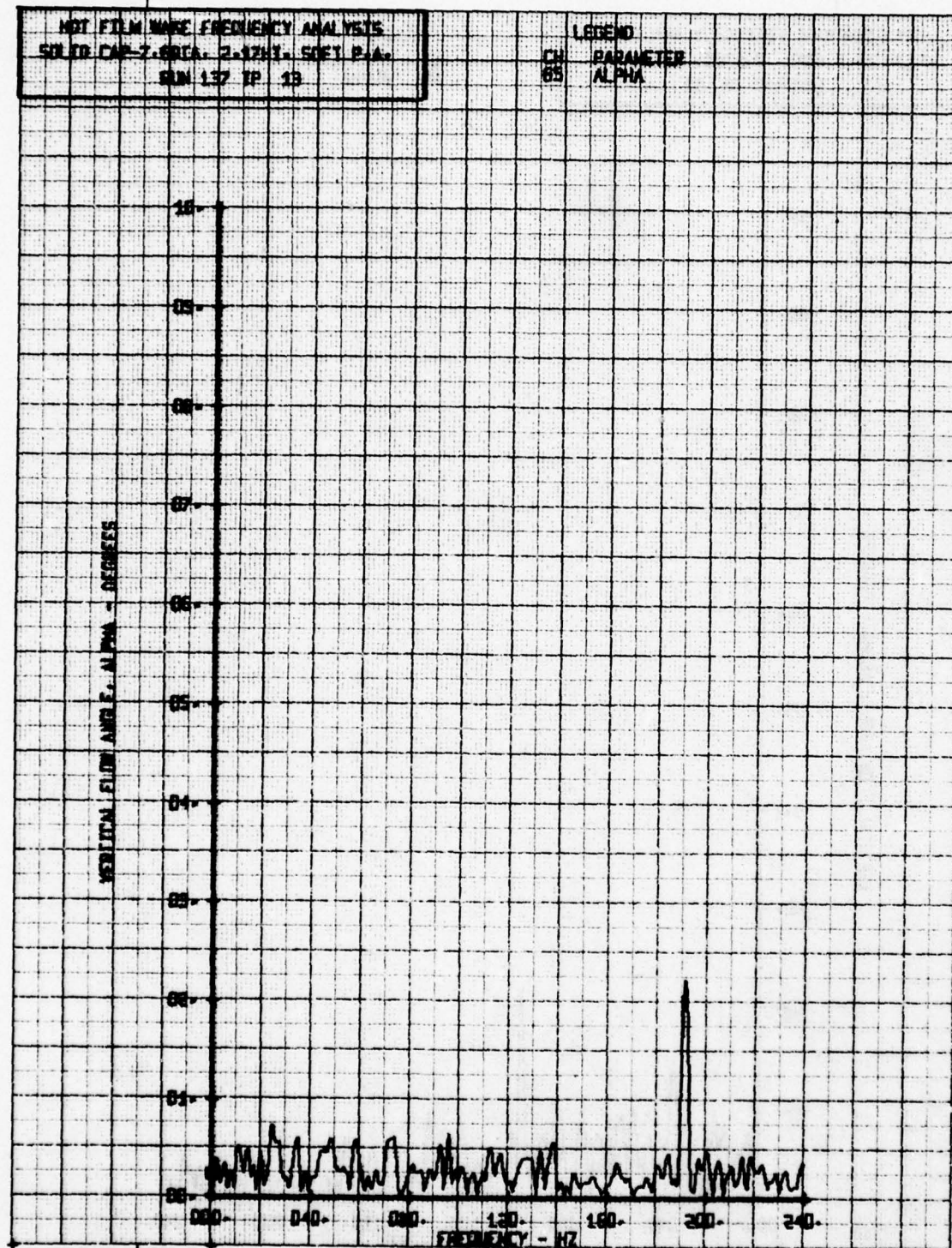
LEGEND
 CH PARAMETER
 ES ALPHA

VERTICAL FILM ANGLE, ALPHA - DEGREES



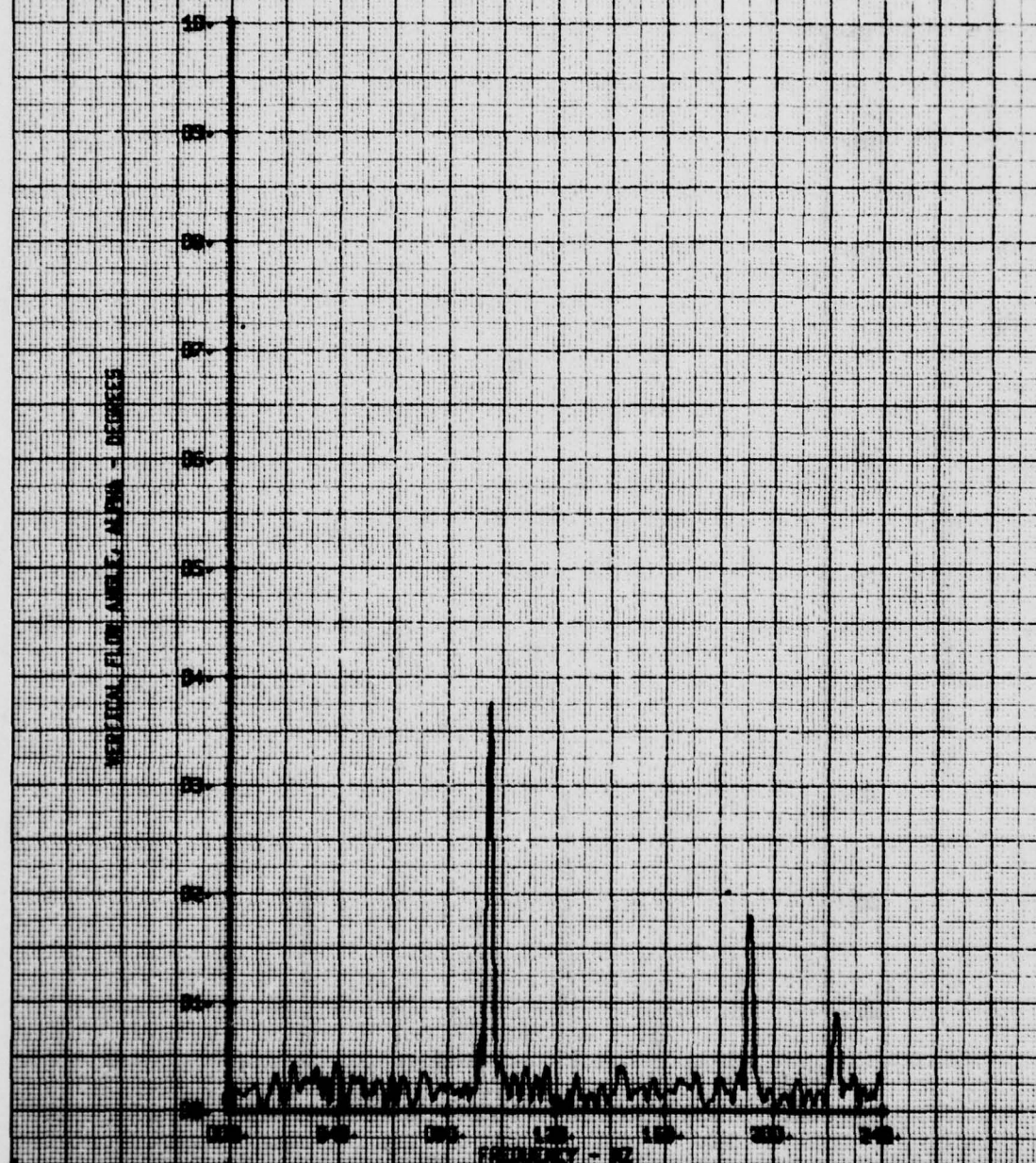
HOT FILM WAKE FREQUENCY ANALYSIS
SOLID CAR-7.00CA. 2.17H1. S0ET P-A.
RUN 137 TP 13

LEGEND
CH PARAMETER
65 ALPHA



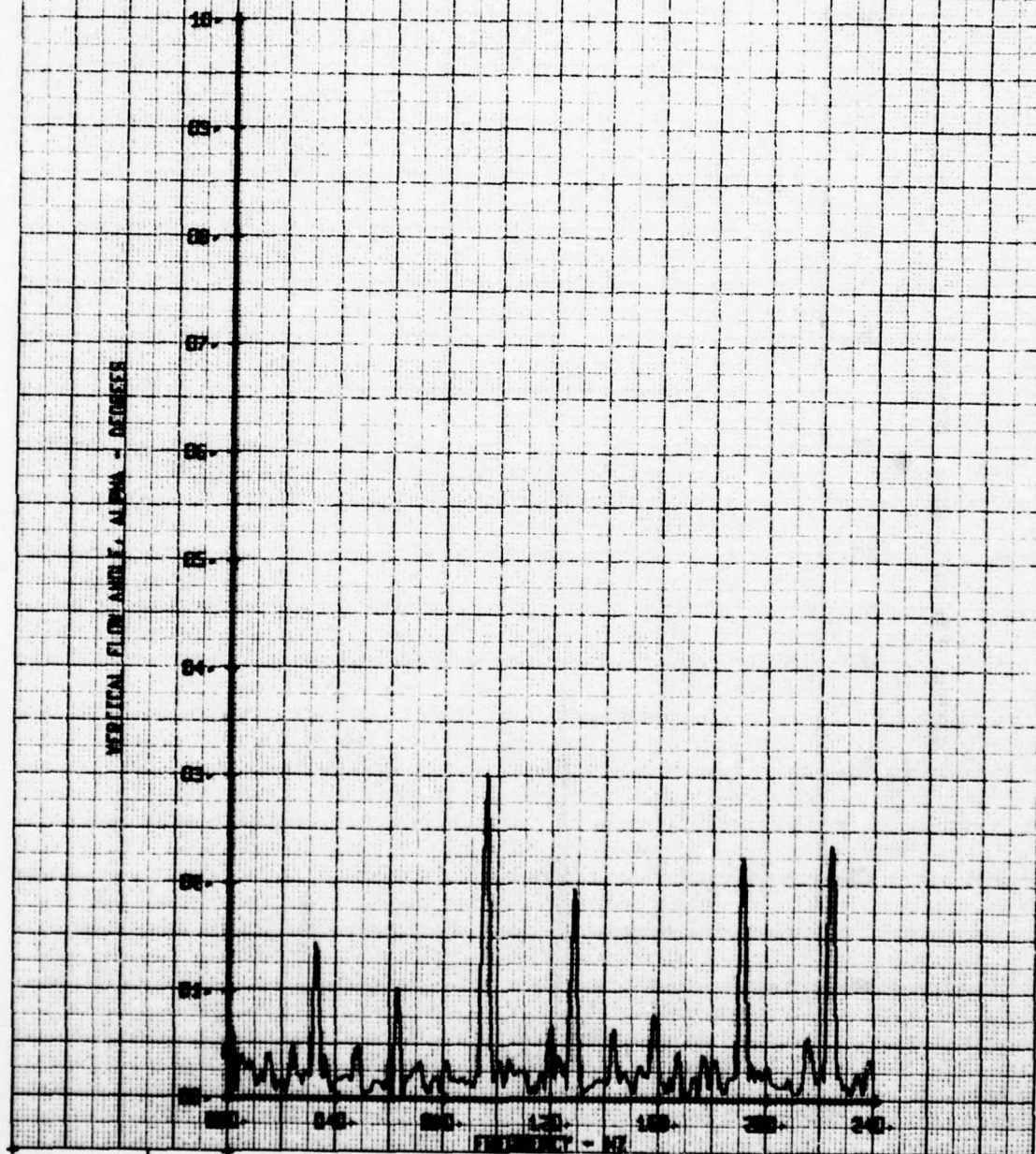
HOT FILM WAKE FREQUENCY ANALYSIS
 SOLID CAP-7.601A. 2-12MT. SOFT P.A.
 RUN 137 TP 15

LEGEND
 CH PARAMETER
 65 ALPHA



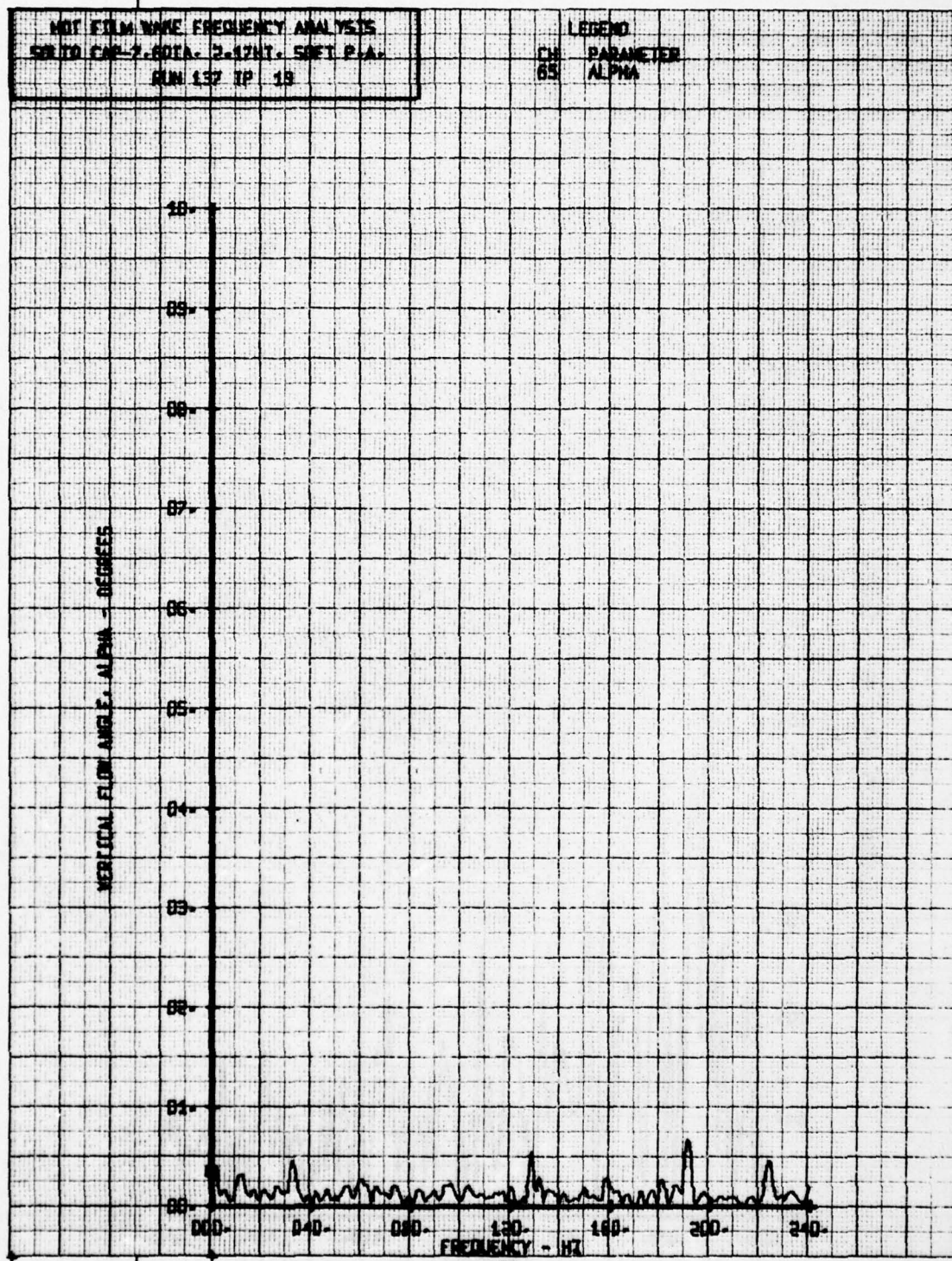
HOT FILM WAVE FREQUENCY ANALYSIS
SOLID CAP-7.60TA. 2-17HT. SOFT P.A.
RUN 137 IP 17

LEGEND
CH 65 PARAMETER
ALPHA



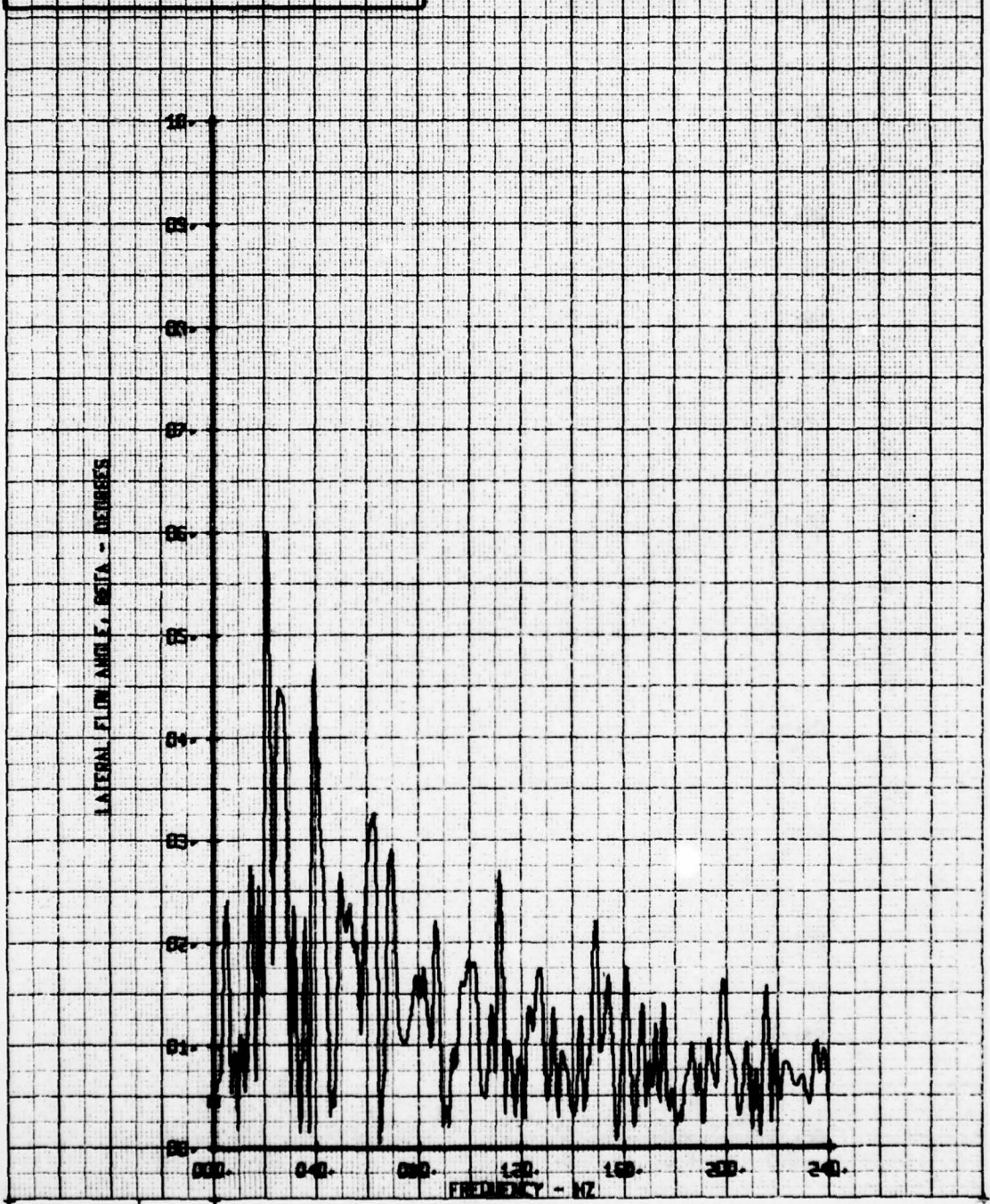
NOT FILM WAVE FREQUENCY ANALYSIS
SMD TO CAP-7.801A- 2.47MT. SDET P.A.
RUN 137 IP 13

LEGEND
CH PARAMETER
65 ALPHA



NOT FILM WARE FREQUENCY ANALYSIS
SOL ID CAP-7.601A, 2.17H1, SDET P.A.
RUN 137 TP 3

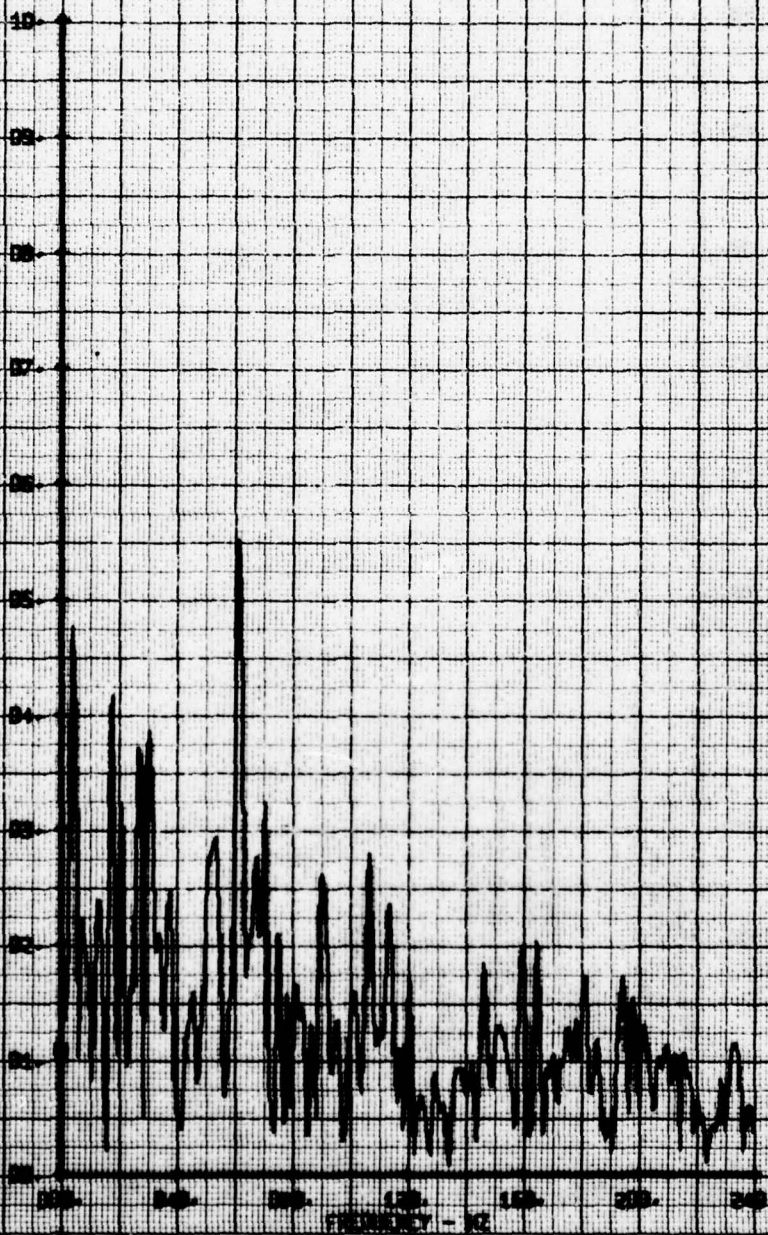
LEGEND
CH PARAMETER
86 BEIA



HOT FILM WAVE FREQUENCY ANALYSIS
 SOLED CAP-7.6DIA- 2.17MT- SOFT P-A-
 RUN 137 TP 5

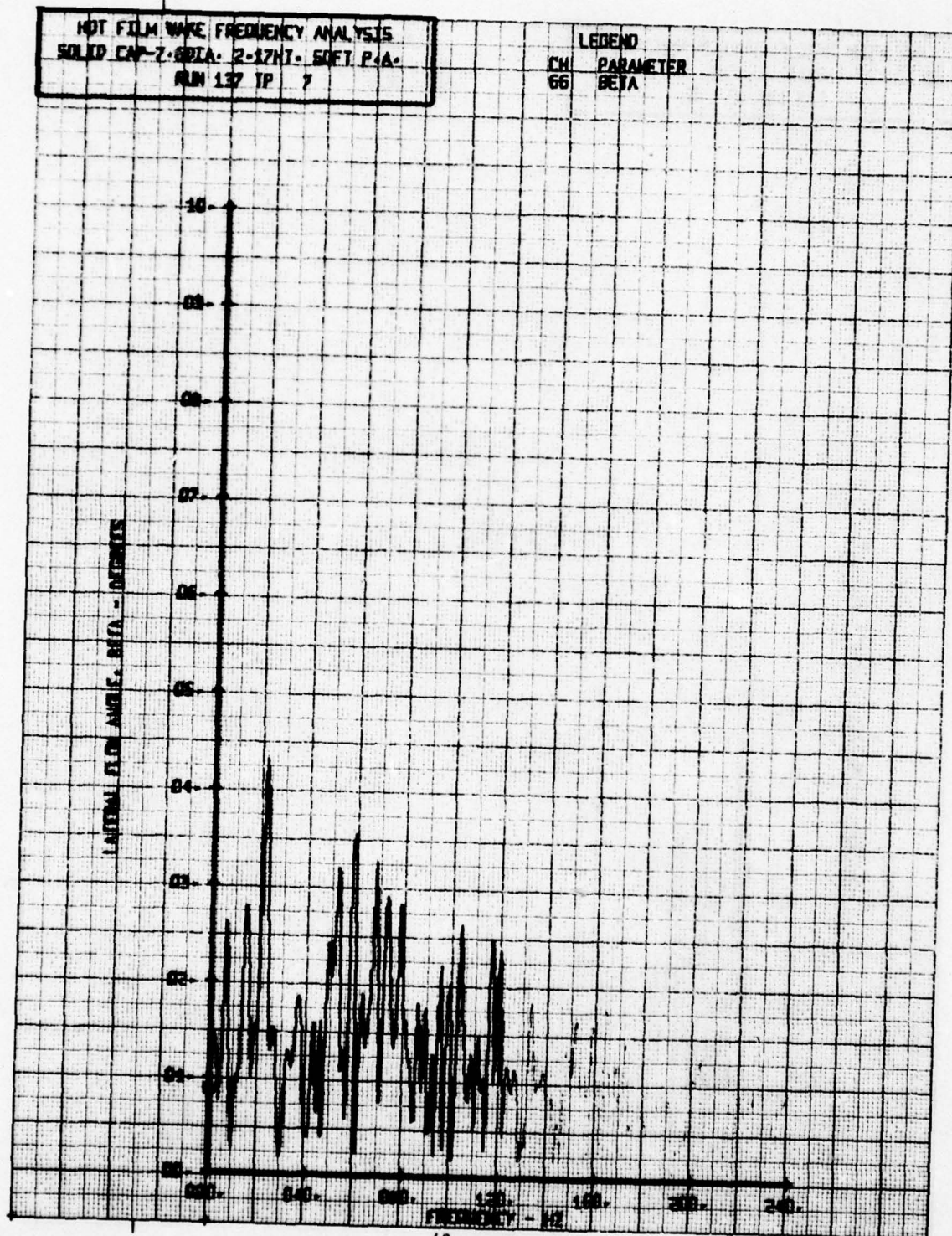
LEGEND
 CH PARAMETER
 66 BETA

LATERAL FIBRE ANGLE, BETA - DEGREES



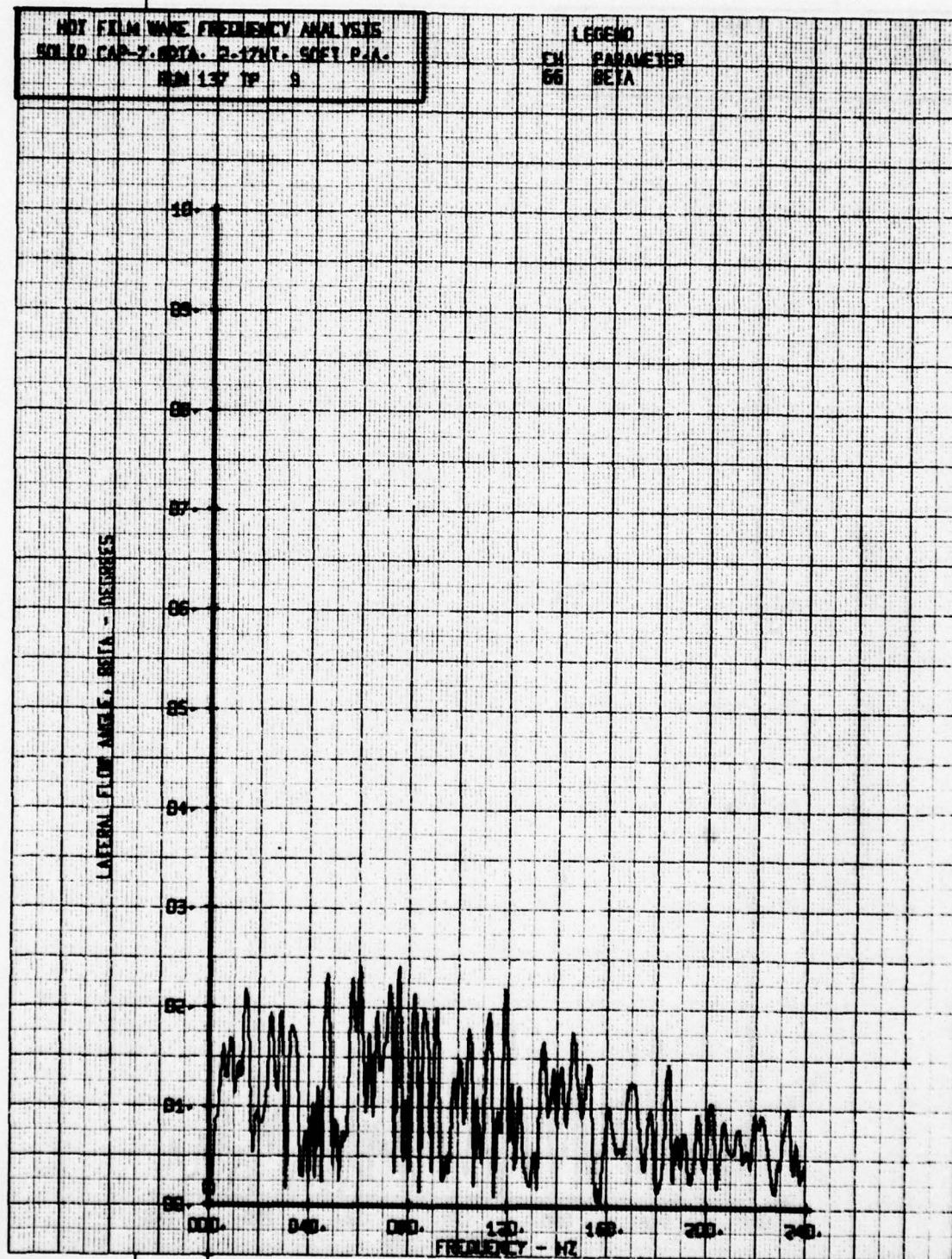
HOT FILM WAVE FREQUENCY ANALYSIS
 SOLID CAP-7.801A-2-17HT-50FT P.A.
 RUN 137 TP 7

CH	PARAMETER
66	BETA



HOT FILM WAVE FREQUENCY ANALYSIS
SOLID CAP-7.02TA. 2-17HT. SOFT P.A.
RHM 137 TP 9

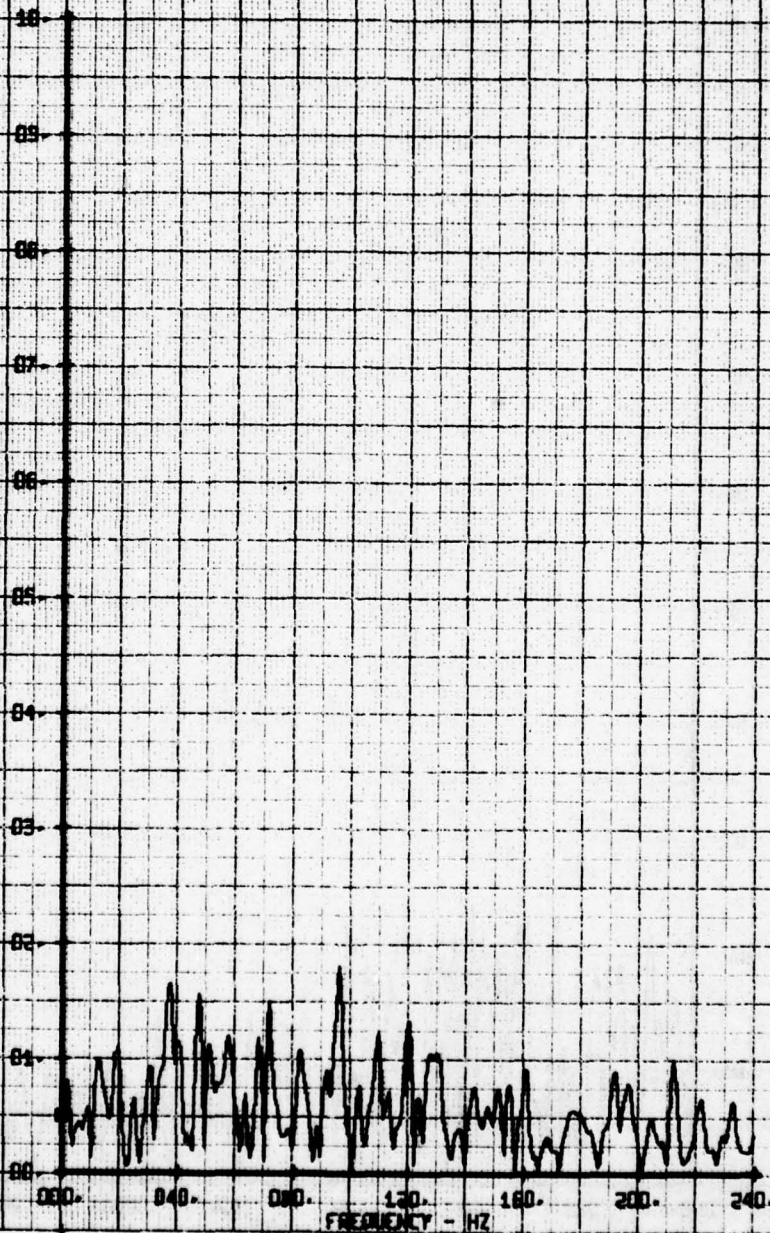
LEGEND
CH PARAMETER
66 BETA



NOT FILM WAVE FREQUENCY ANALYSIS
SOLID CAP-7.80TA. 2-12HT. 50ET P.A.
RUM 137 TP 11

LEGEND
CH PARAMETER
66 BETA

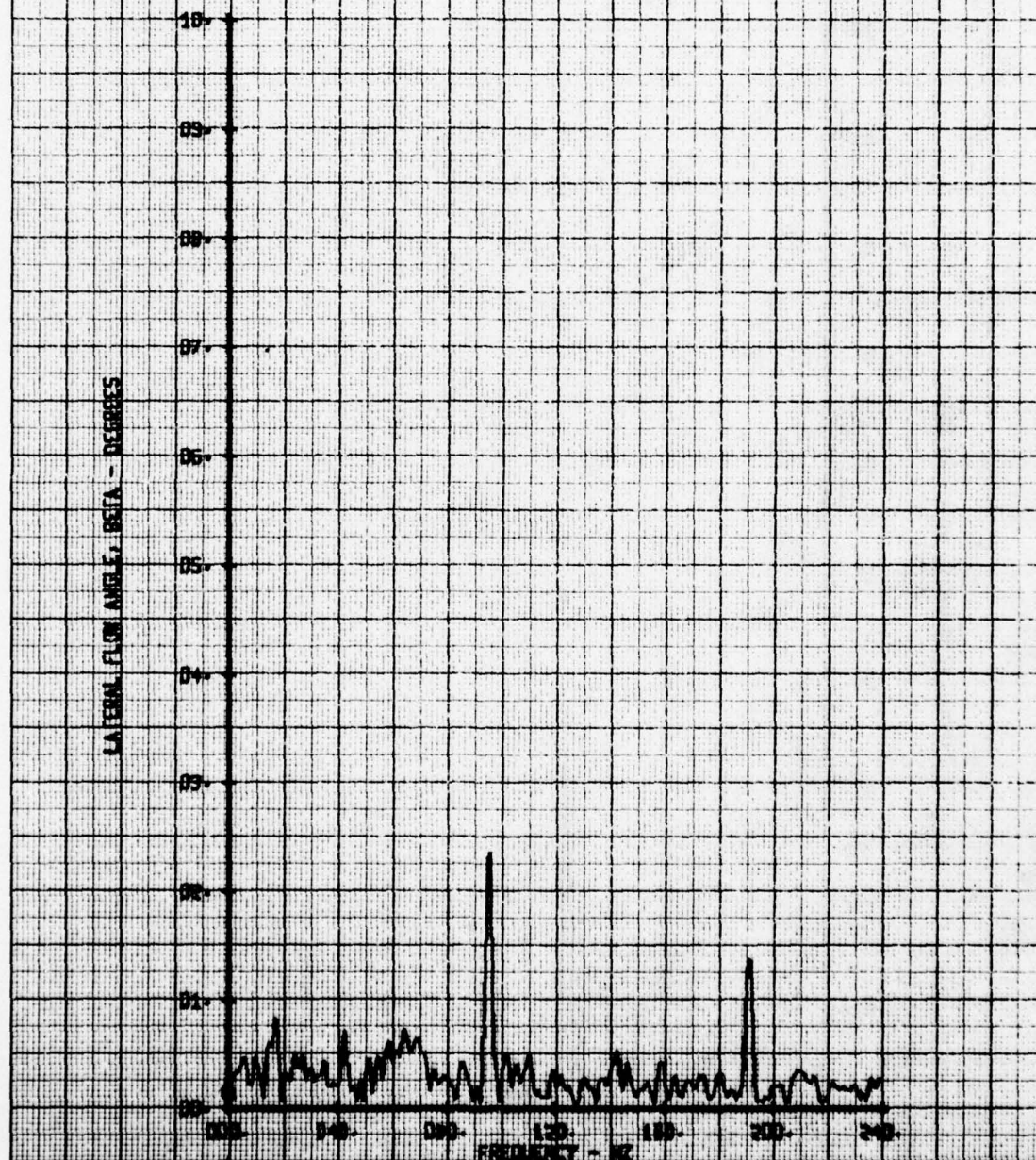
LATERAL FILM ANGLE, BETA - DEGREE



HOT FILM WAKE FREQUENCY ANALYSIS
SOLID CAP-7.601A, 2.17MT, SOFT P.A.
RUN 137 TP 13

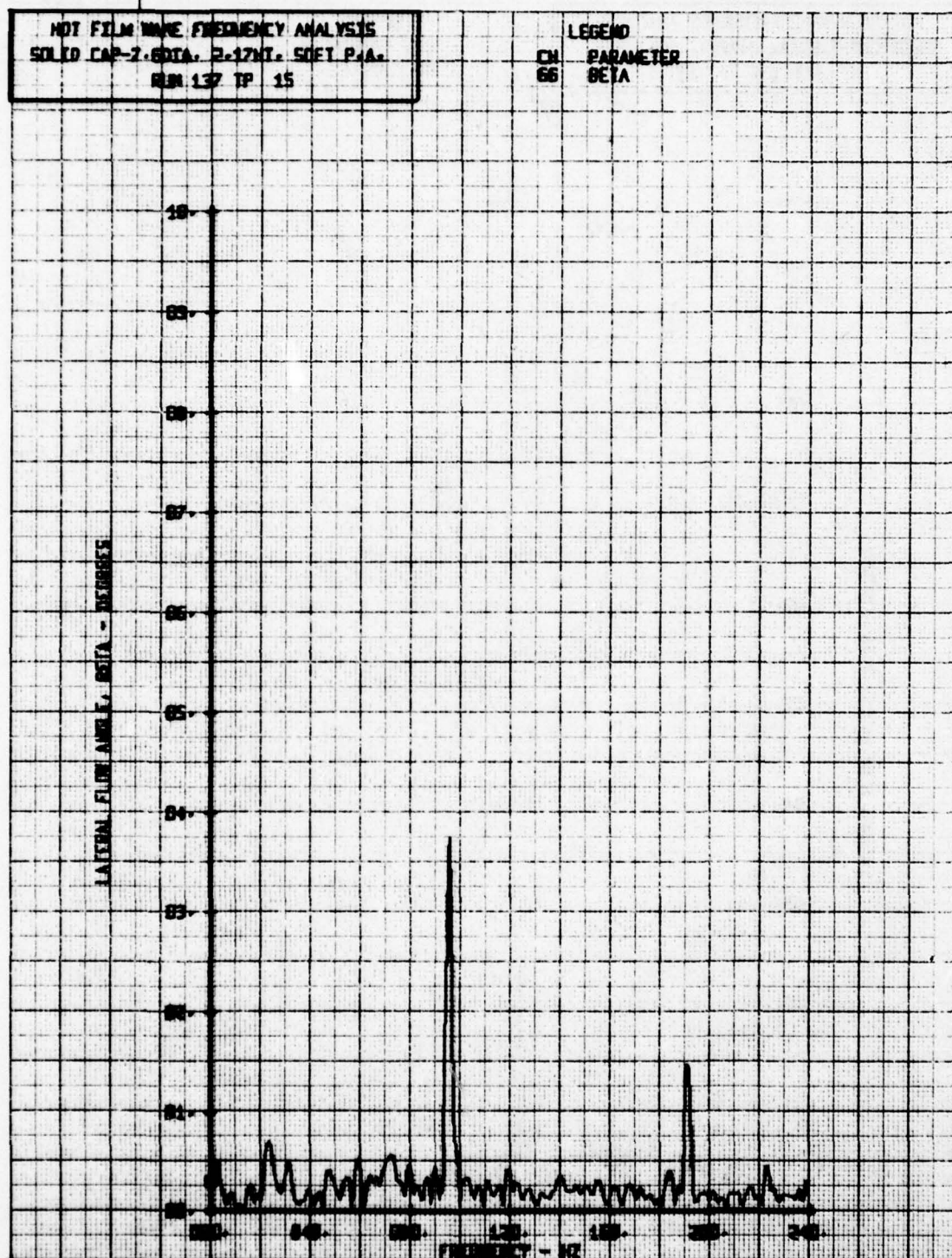
LEGEND
CH 56 PARAMETER
BETA

LATERAL FLOW ANGLE, BETA - DEGREES



NOT FILM WAVE FREQUENCY ANALYSIS
SOLID CAP-2.6DTA, 2.47MT. SOFT P.A.
RIN 137 TP 15

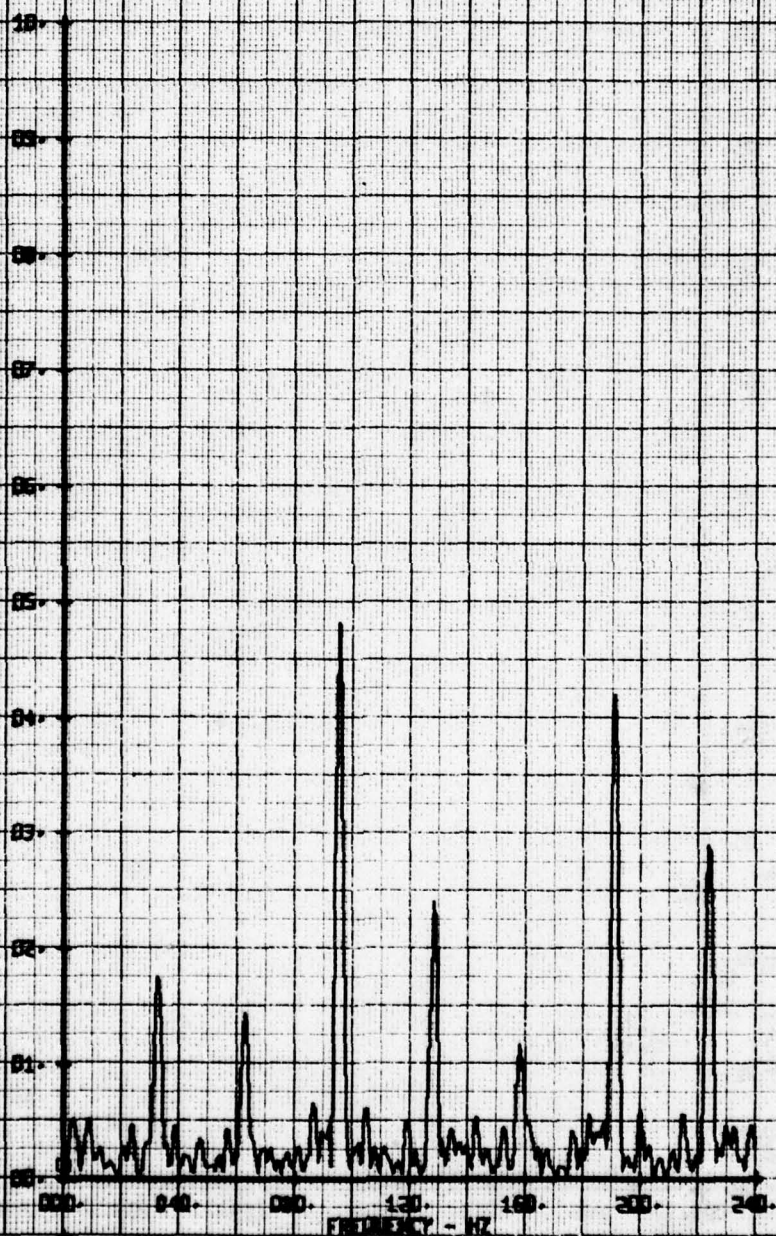
LEGEND
CH PARAMETER
66 BETA



HOT FILM WAVE FREQUENCY ANALYSIS
 SOLID CAP-2.601A, 2.124T, 50F1 P.A.
 RM 137 TP 12

LEGEND
 CH PARAMETER
 66 BETA

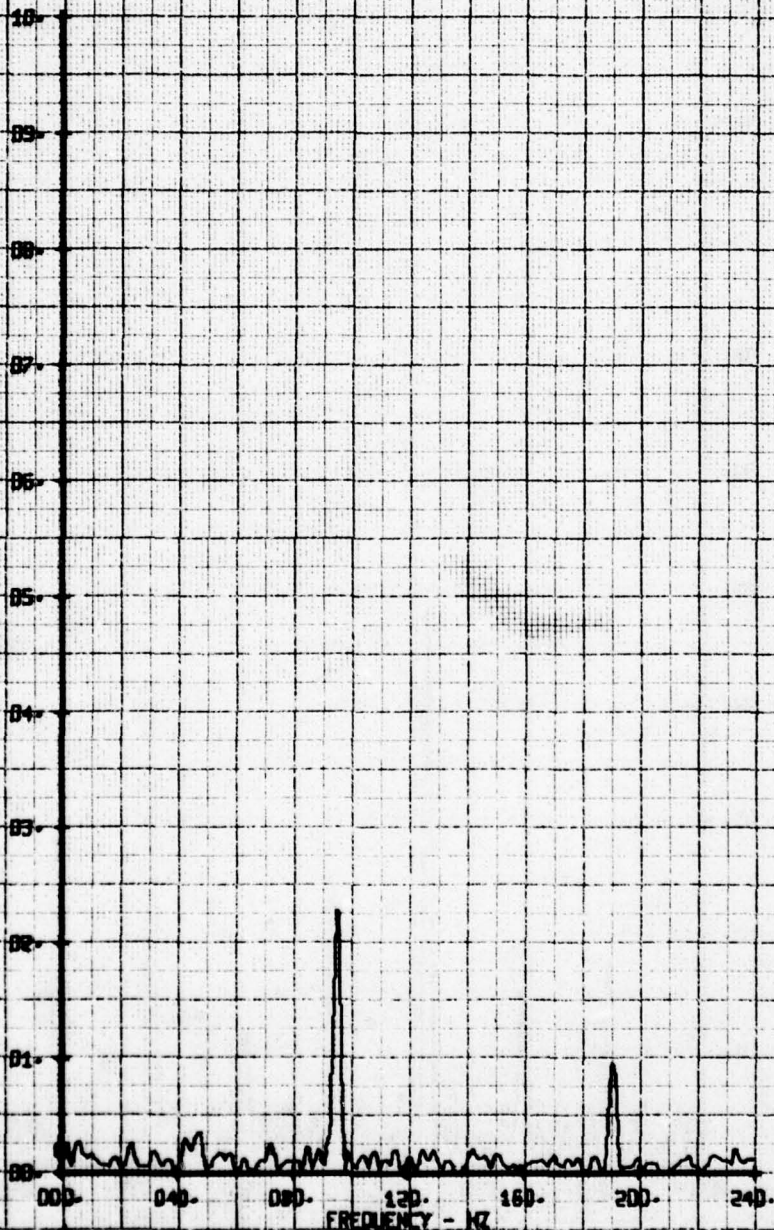
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WARE FREQUENCY ANALYSIS
SOL ID CAP-2.601A. 2.12MT. SOFT P.A.
RUN 137 TP 19

LEGEND
CH PARAMETER
56 BETA

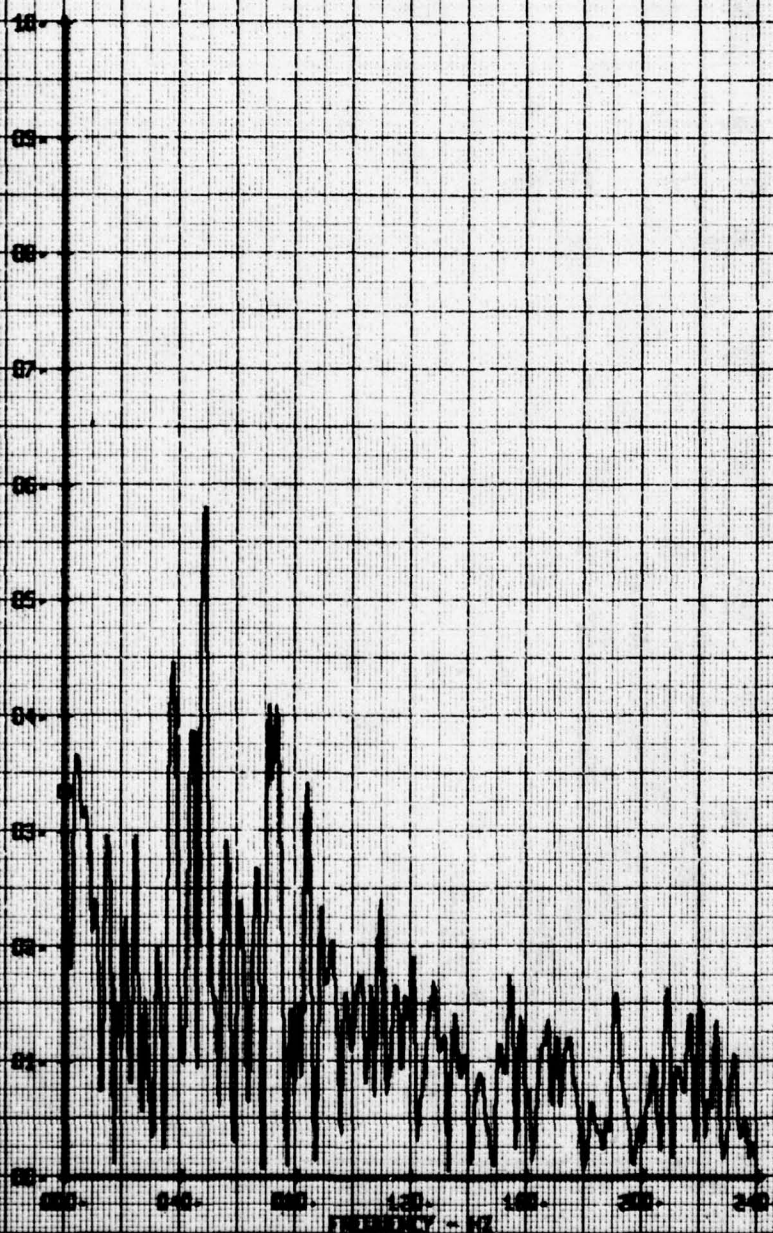
LATERAL FLOW ANGLE, BETA - DEGREES



NOT FILM WAVE FREQUENCY ANALYSIS
SOLID CAP-7.6DIA. 2.12HZ. SPT P.A.
RUN 137 TP 3

LEGEND
CH 65
PARAMETER
V-ALPHA

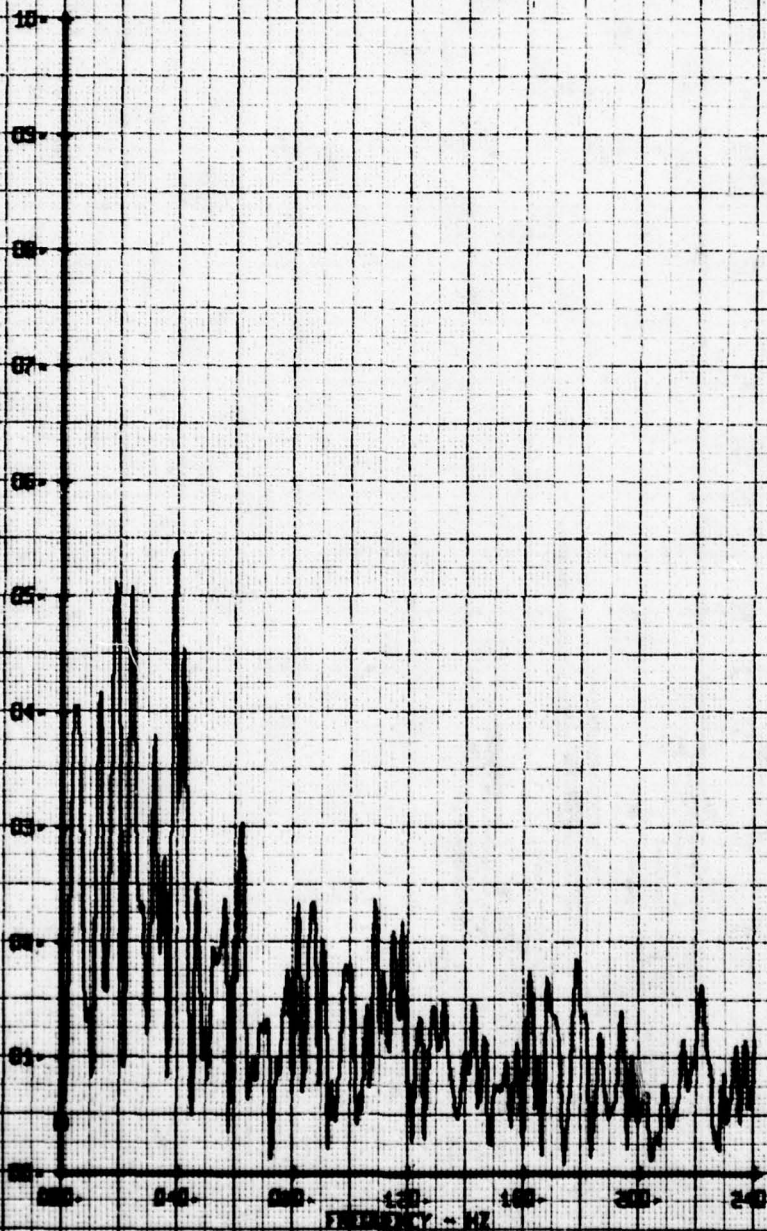
V-ALPHA VELOCITY COMPONENT V-ALPHA RMS



HOT FILM WAKE FREQUENCY ANALYSIS
SOLID CAP-7.6DIA. 2.17HT. SOFT P.I.A.
RUN 137 TP 5

LEGEND
CH 65
PARAMETER
V-ALPHA

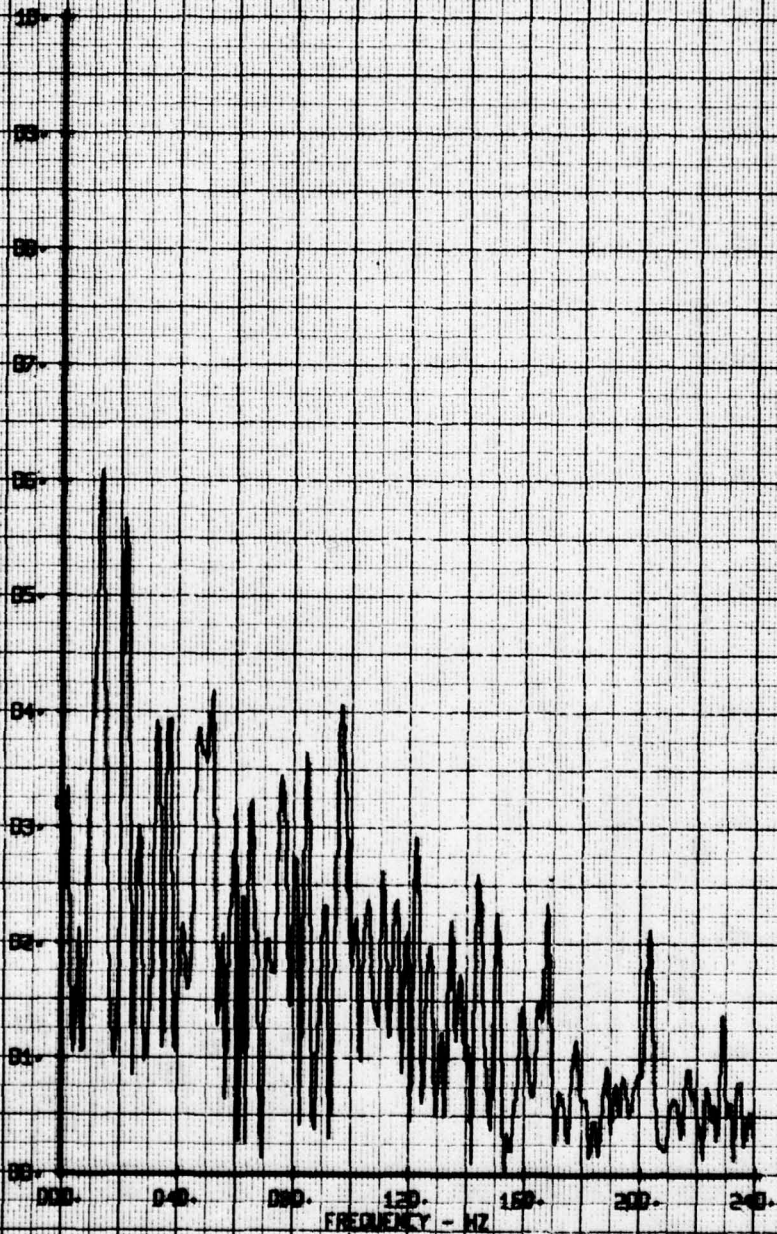
V-ALPHA FREQUENCY V-ALPHA FPS



HOT FILM WAKE FREQUENCY ANALYSIS
 SOLID CAR-7. DATA. 2-17-61. GLEY P.A.
 RUN 137 TP 7

LEGEND
 ON PARAMETER
 BS V-ALPHA

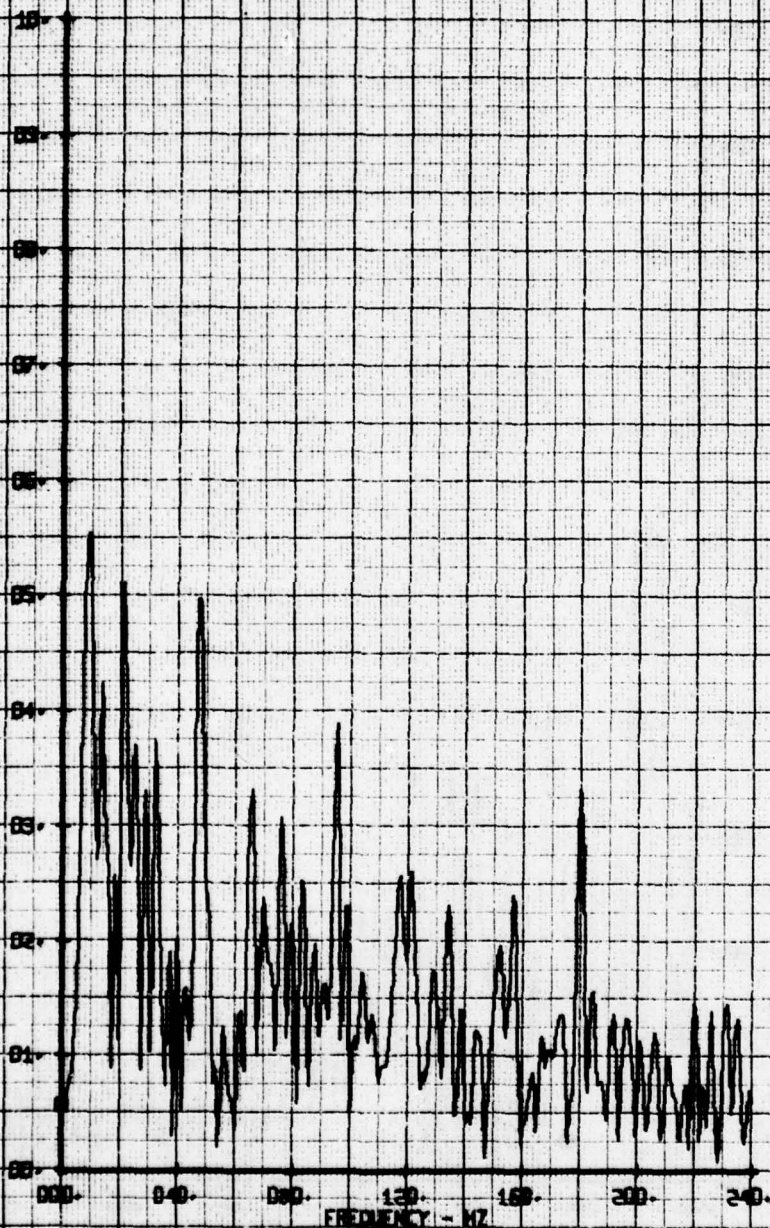
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WIRE FREQUENCY ANALYSIS
SOLID CAP-7.501A. 2-17-67. SOFT P.A.
RUN 137 TP. 9

LEGEND
ON PARAMETER
BS V-ALPHA

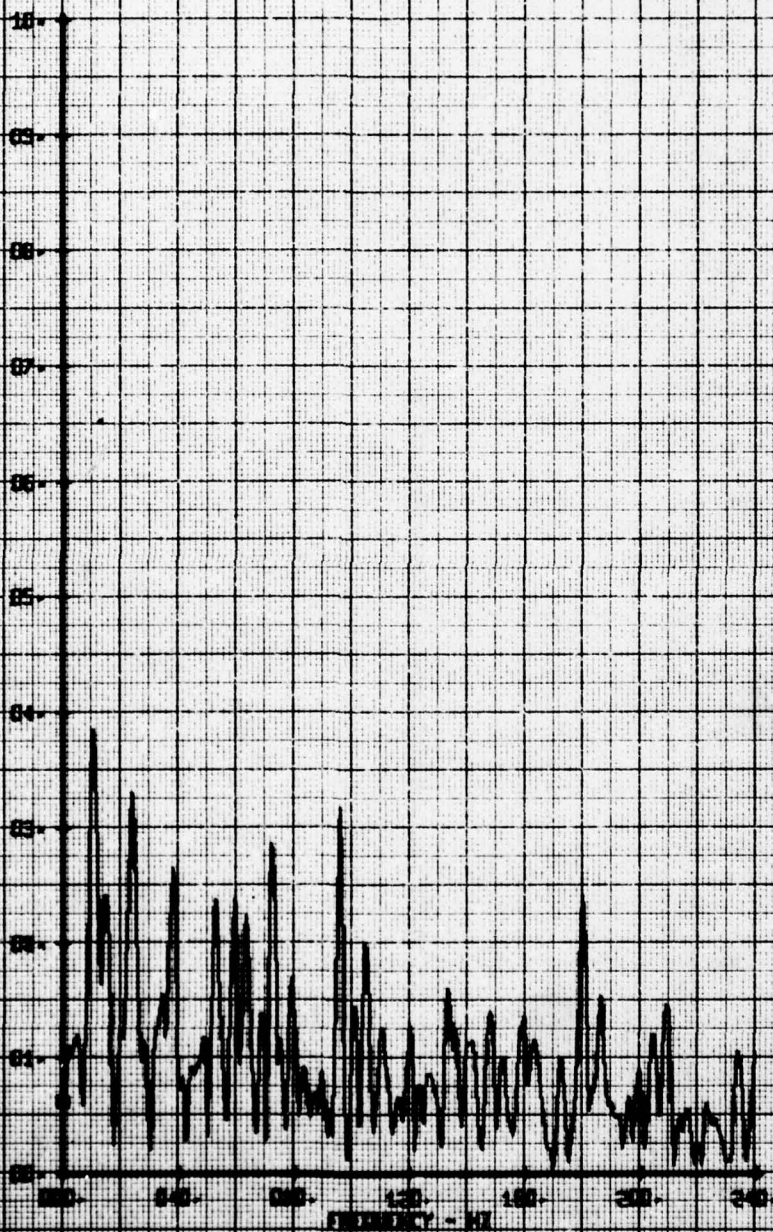
A-Y VELOCITY COMPONENT V-ALPHA RPS



NOT FILM WAVE FREQUENCY ANALYSIS
 SOLID CAP-7.60TA, 2.17HI, 50FT P.A.
 RUN 137 IP 11

LEGEND
 CH PARAMETER
 65 V-ALPHA

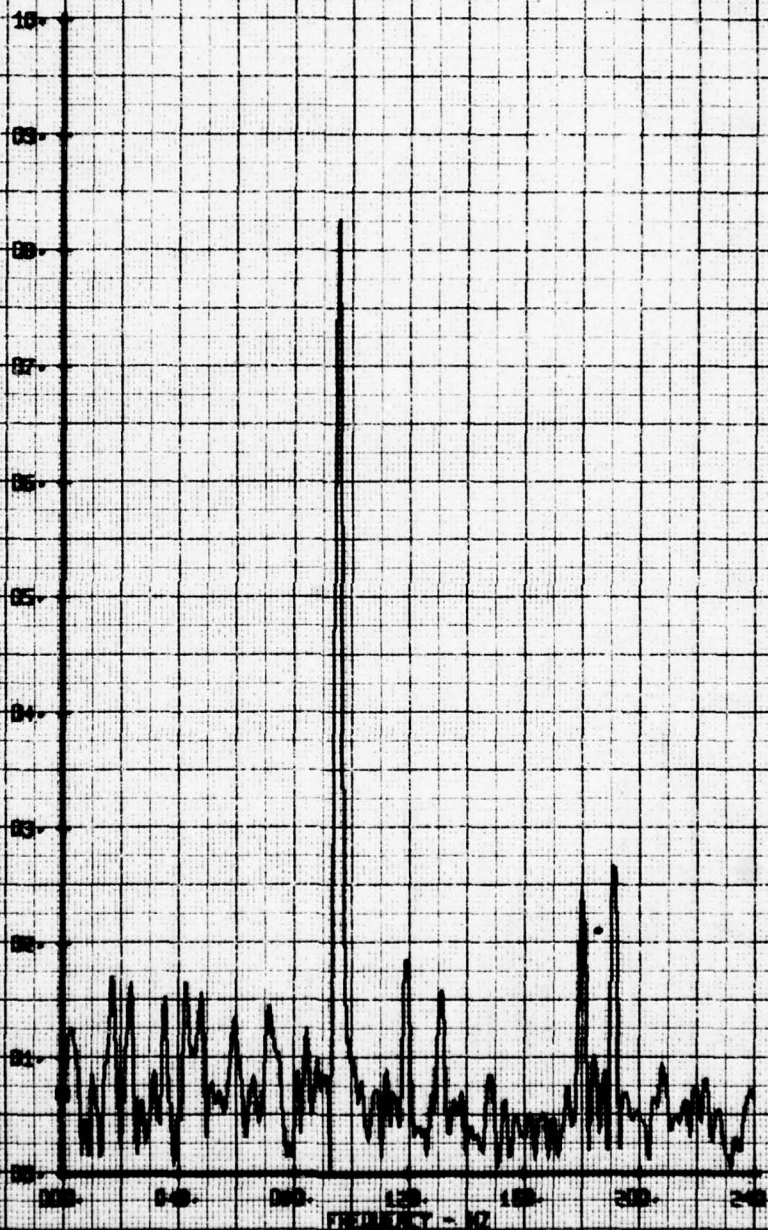
10-V VELOCITY COMPONENT V-ALPHA DBS



HOT FILM WAKE FREQUENCY ANALYSIS
SOLID CAP-2.6DTA. 2.17MT. 50ET P.A.
RUN 137 TP 13

LEGEND
CH PARAMETER
BS V-ALPHA

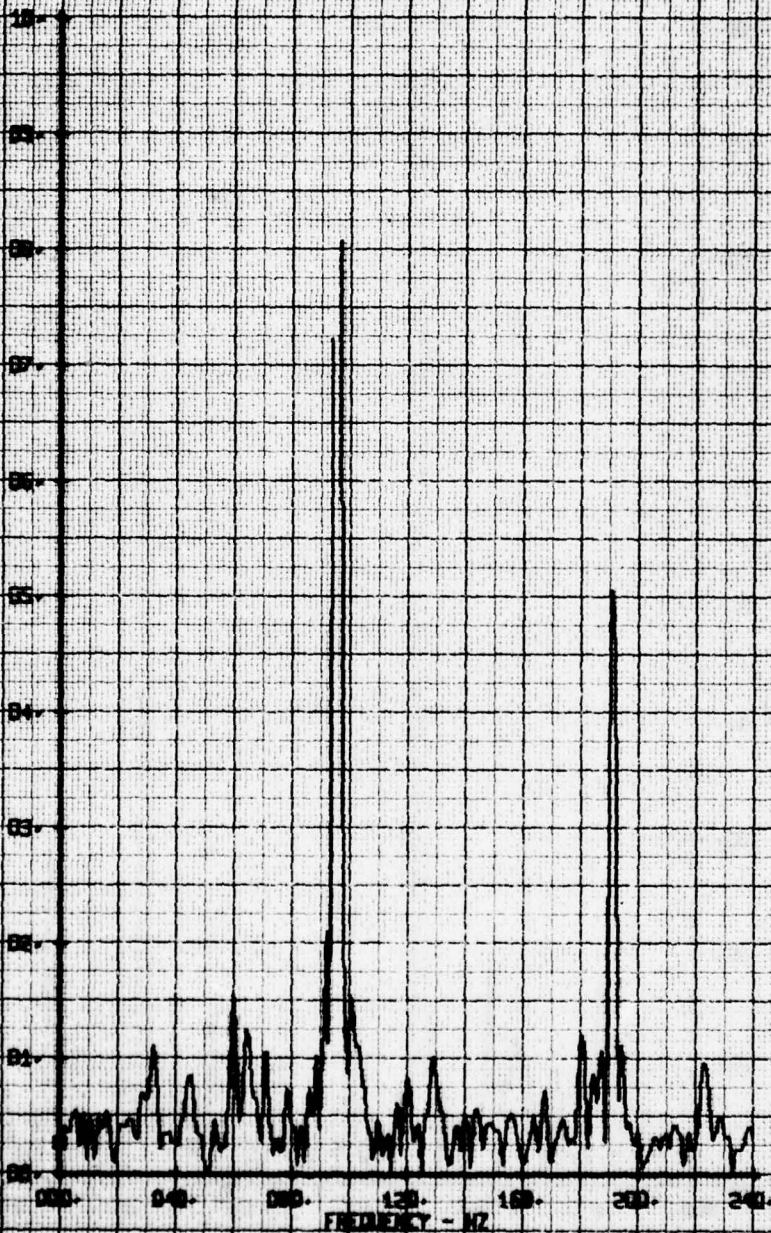
A-Y VELOCITY COMPONENT V-ALPHA PPS

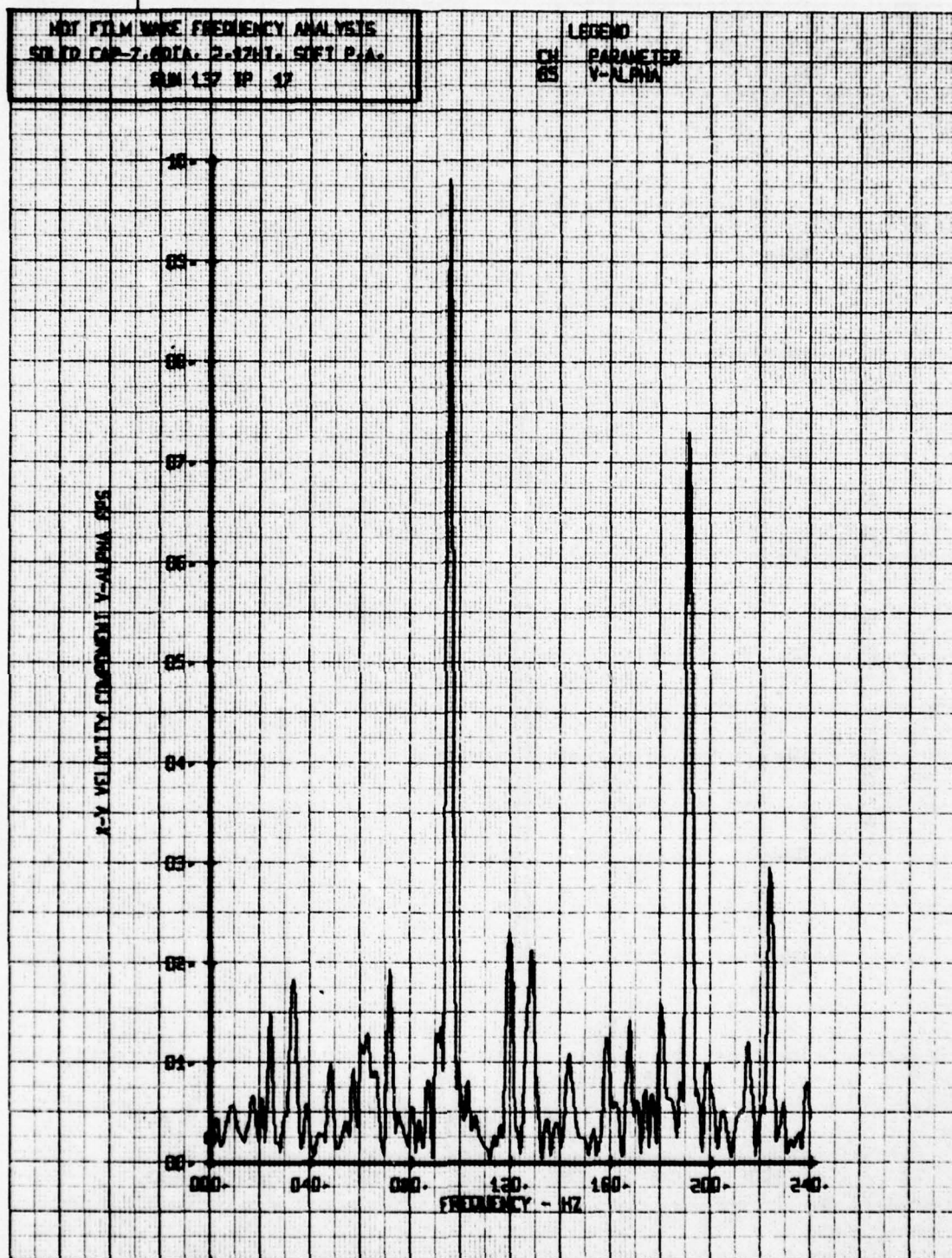


NOI FILM WAVE FREQUENCY ANALYSIS
 50 TO 240 HZ. 2.5781. 500 P.A.
 RM 130 12 35

LEGEND
 CH PARAMETER
 01 V-ALPHA

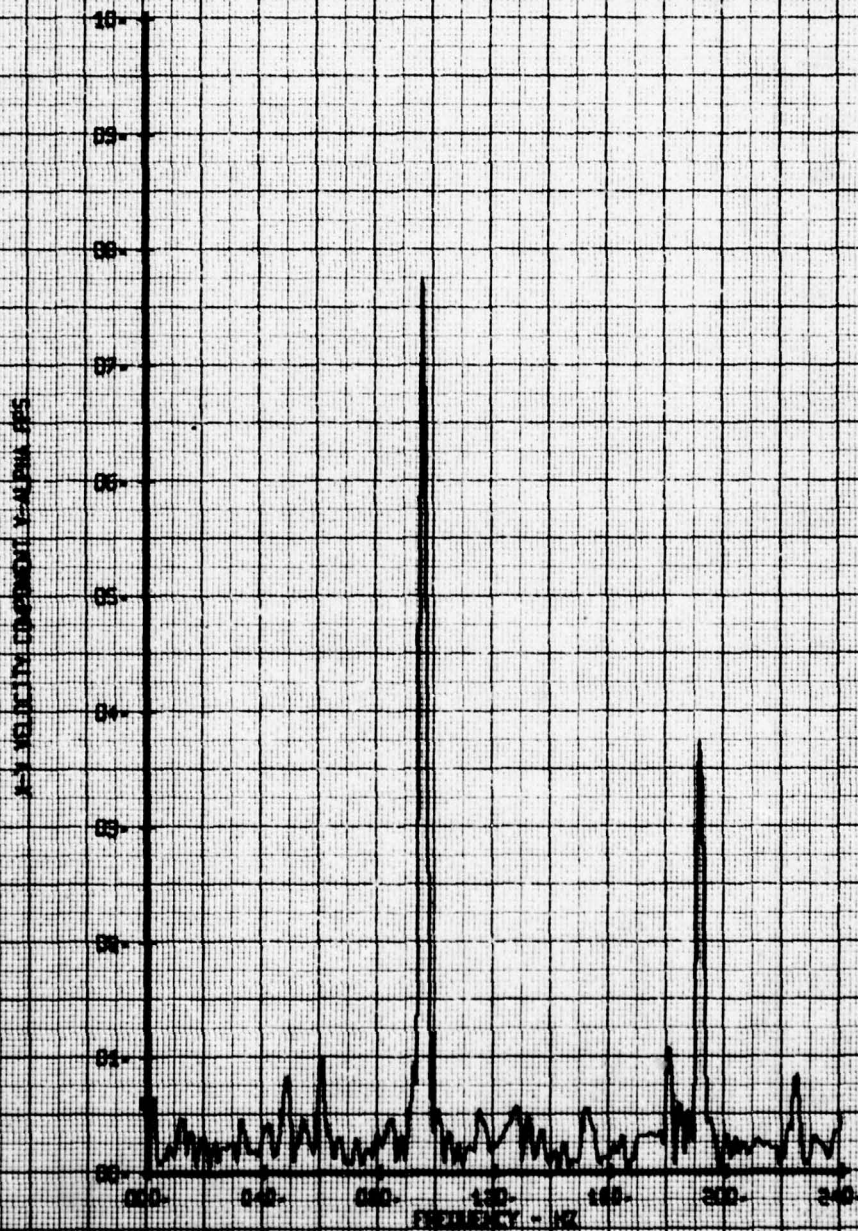
V-ALPHA COMPONENT V-ALPHA FPS





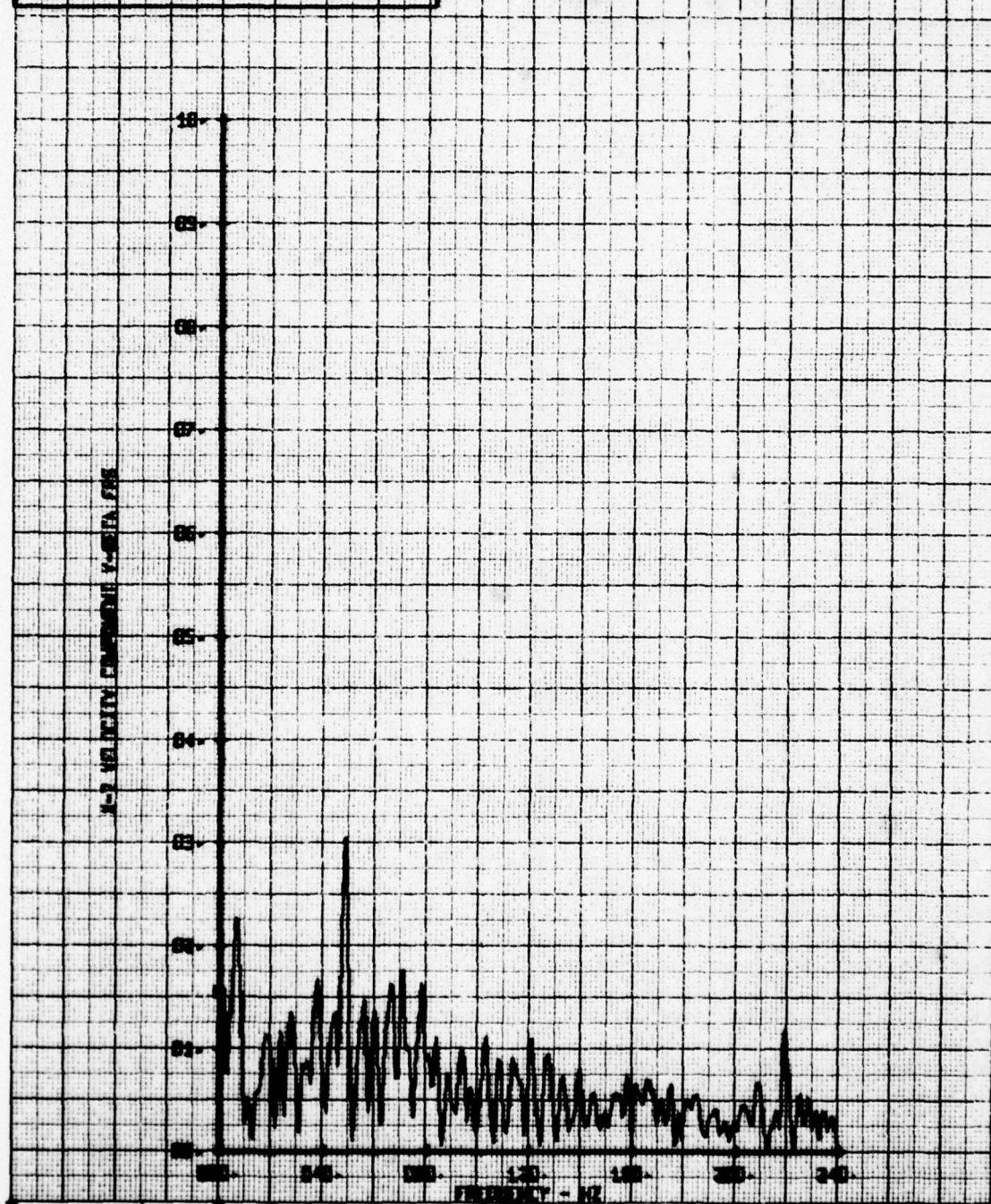
NOT FILM WAKE FREQUENCY ANALYSIS
 SOLID CAP-7.601A. 2.17HT. SNET P.A.
 RUN 137 TP 13

LEGEND
 CH 65
 PARAMETER
 V-ALPHA



HOT FILM WAVE FREQUENCY ANALYSIS
 SOLID CAP-7.00TA. 2-12HY. 50ET P.A.
 RUN 137 TP 3

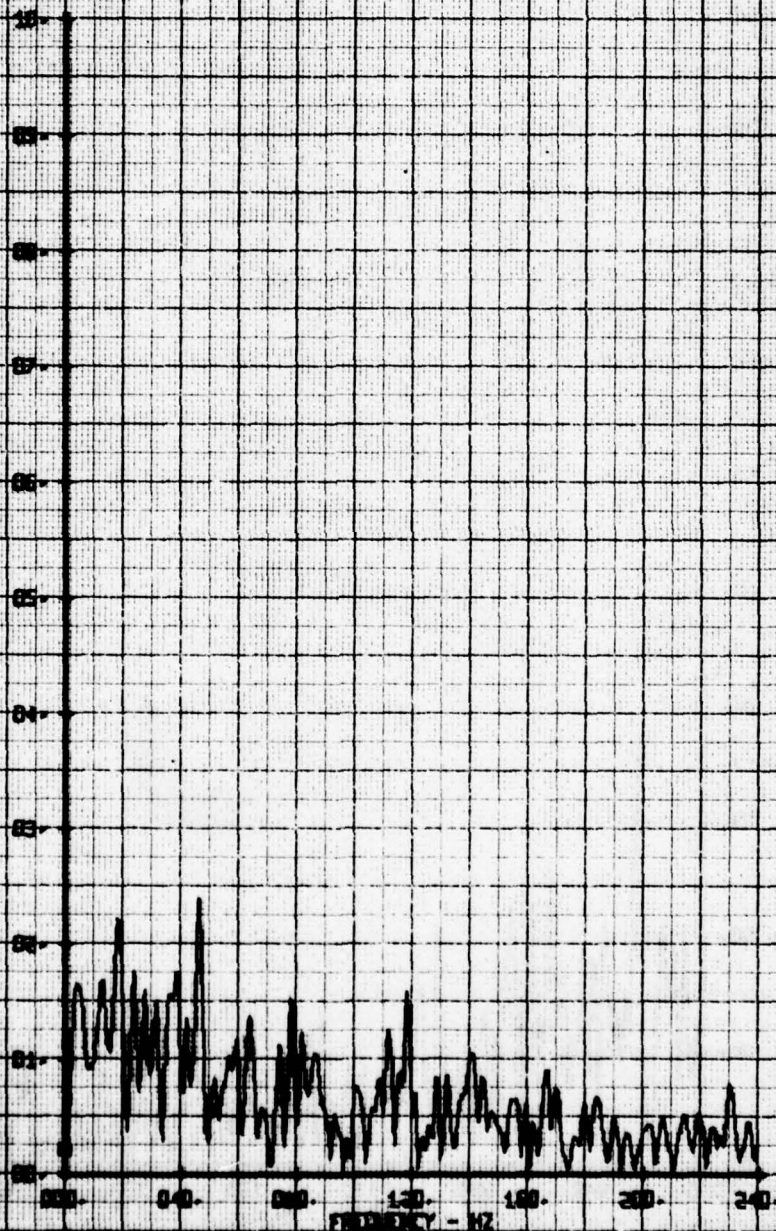
LEGEND
 CH PARAMETER
 66 V-BETA



NEW FILM WAVE FREQUENCY ANALYSIS
 SGTED CAP-7.00TA. 2.1747. SGT1 P.A.
 RUN 137 SP 5

LEGEND
 CM PARAMETER
 00 V-BETA

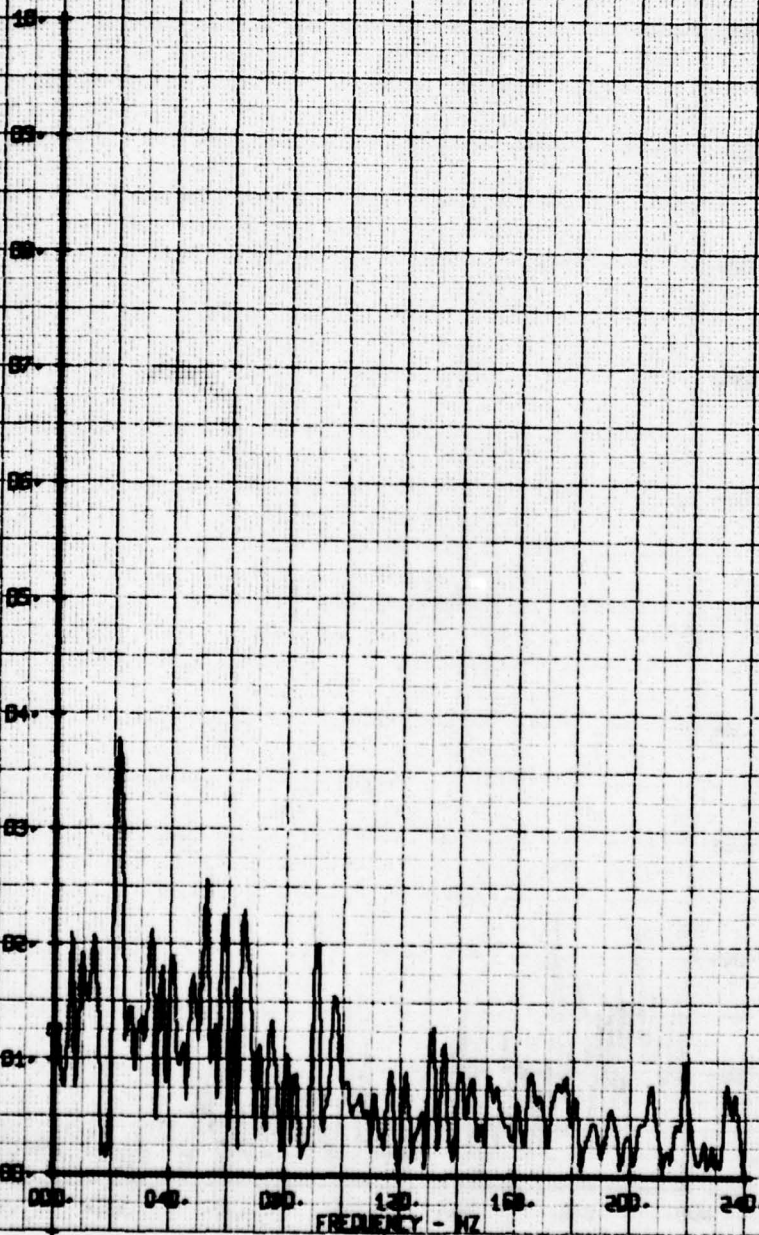
V-BETA COMPONENT V-BETA FREQ



NOT FILM WAVE FREQUENCY ANALYSIS
 SOLID CAP-7.8DTA, 2.12MT, SDET P.A.
 RUN 137 TP 2

LEGEND
 CH PARAMETER
 BB V-BETA

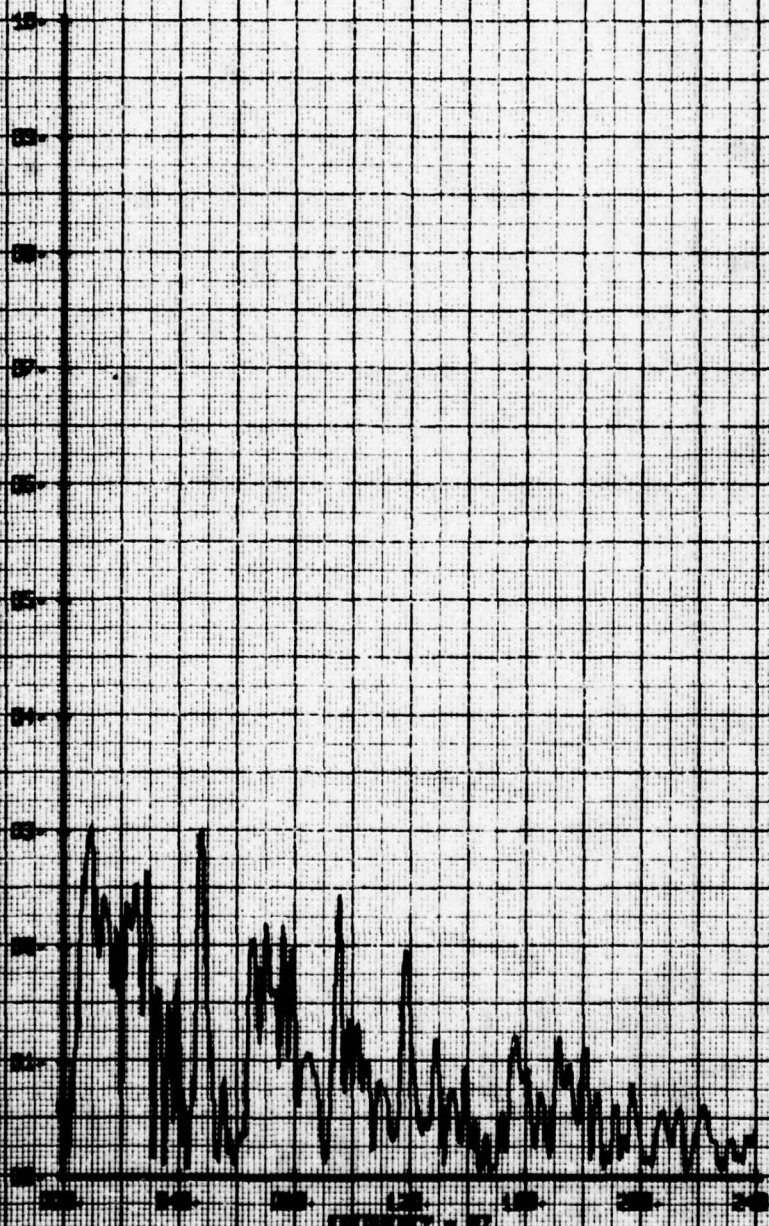
X-2 VELOCITY COMPONENT V-BETA FBS



NOY FILM WAKE FREQUENCY ANALYSIS
 SOLID CAP-7.60TA, 2.17MT, 50FT P.A.
 RUN 137 TP 9

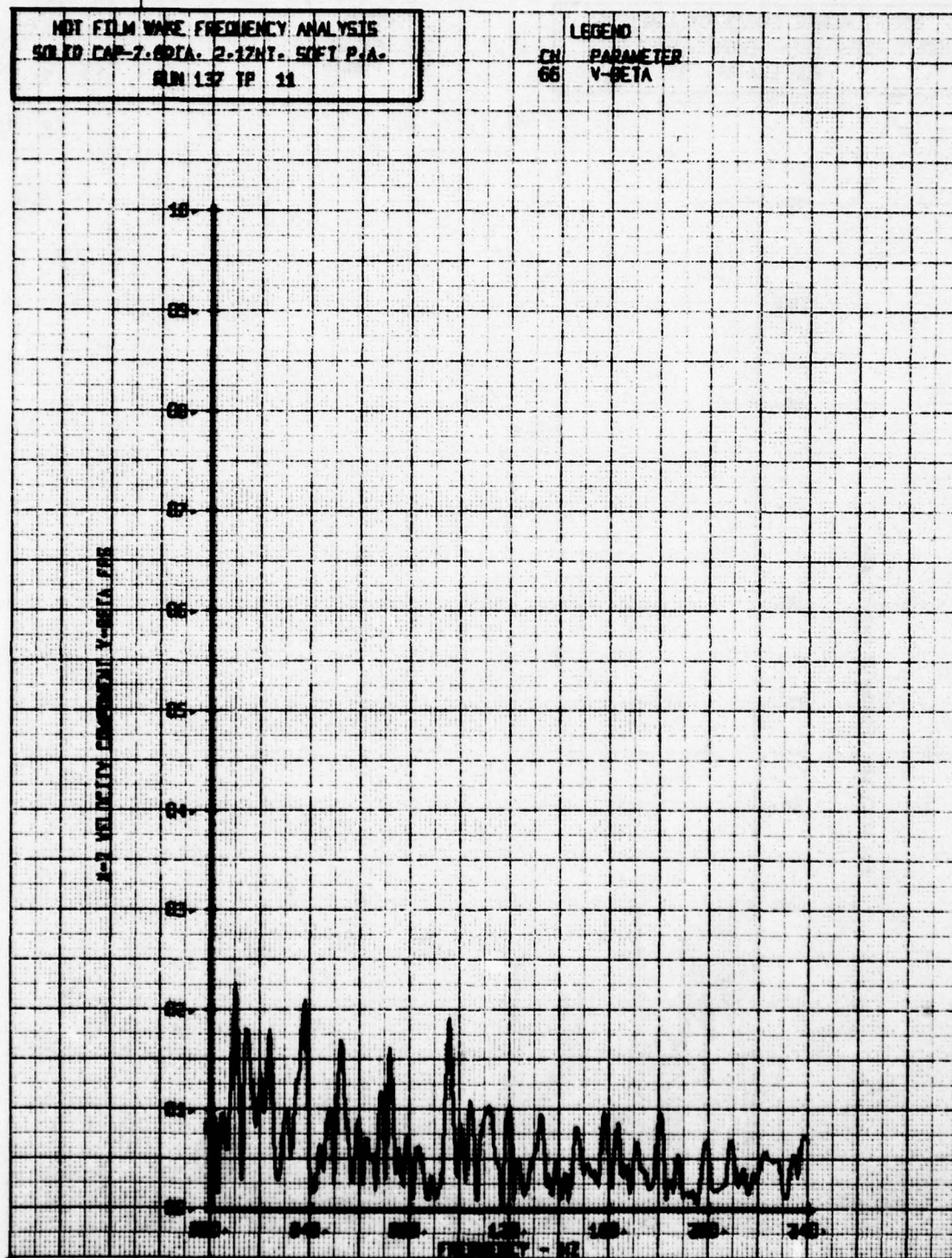
LEGEND
 CN PARAMETER
 66 V-BETA

1.1 VELOCITY COMPONENT V-BETA 225



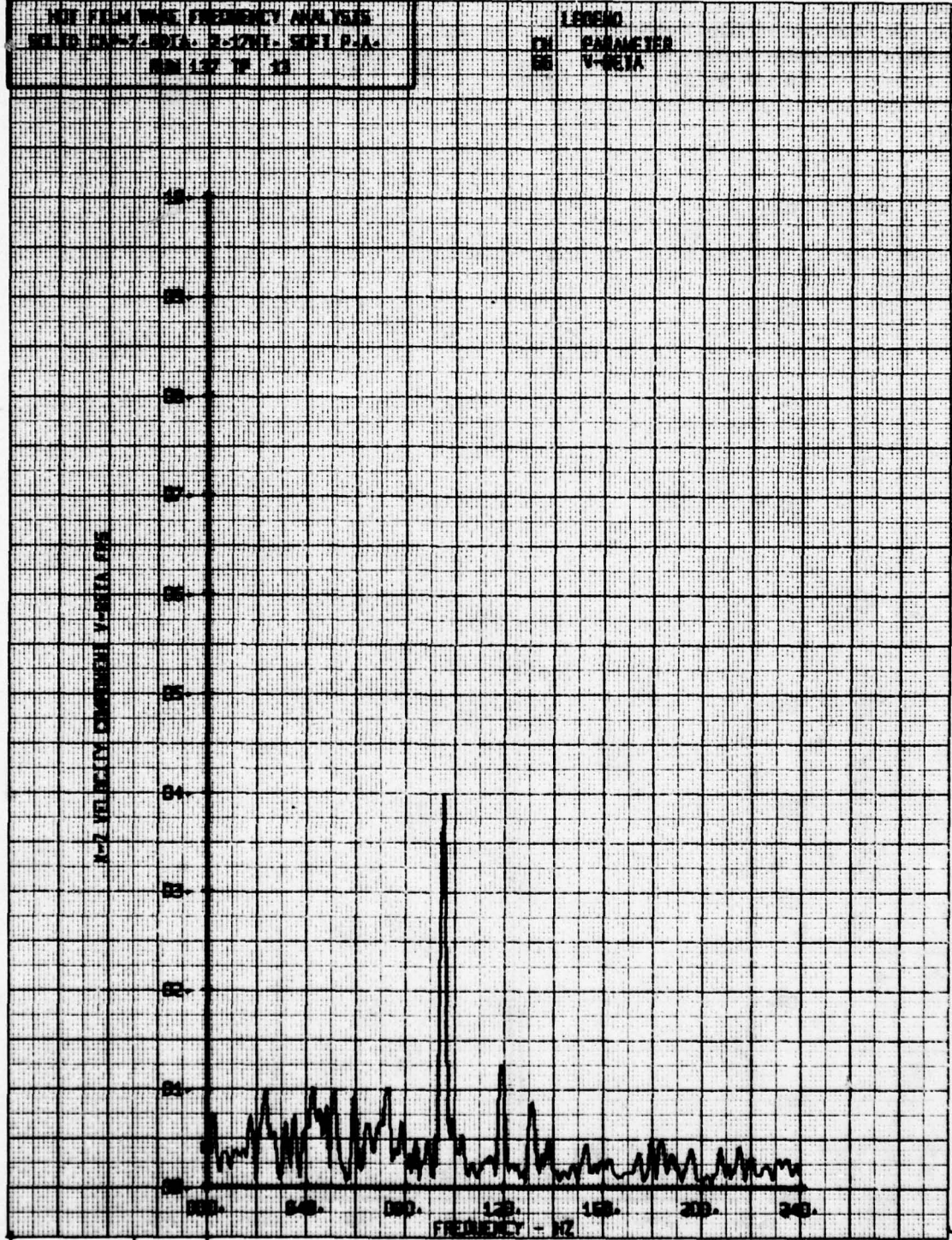
NOT FILM WARE FREQUENCY ANALYSIS
 SOLID CAP-7.0P/A. 2.17HT. 50FT P/A.
 RUN 137 TP 11

LEGEND
 CH PARAMETER
 66 V-BETA



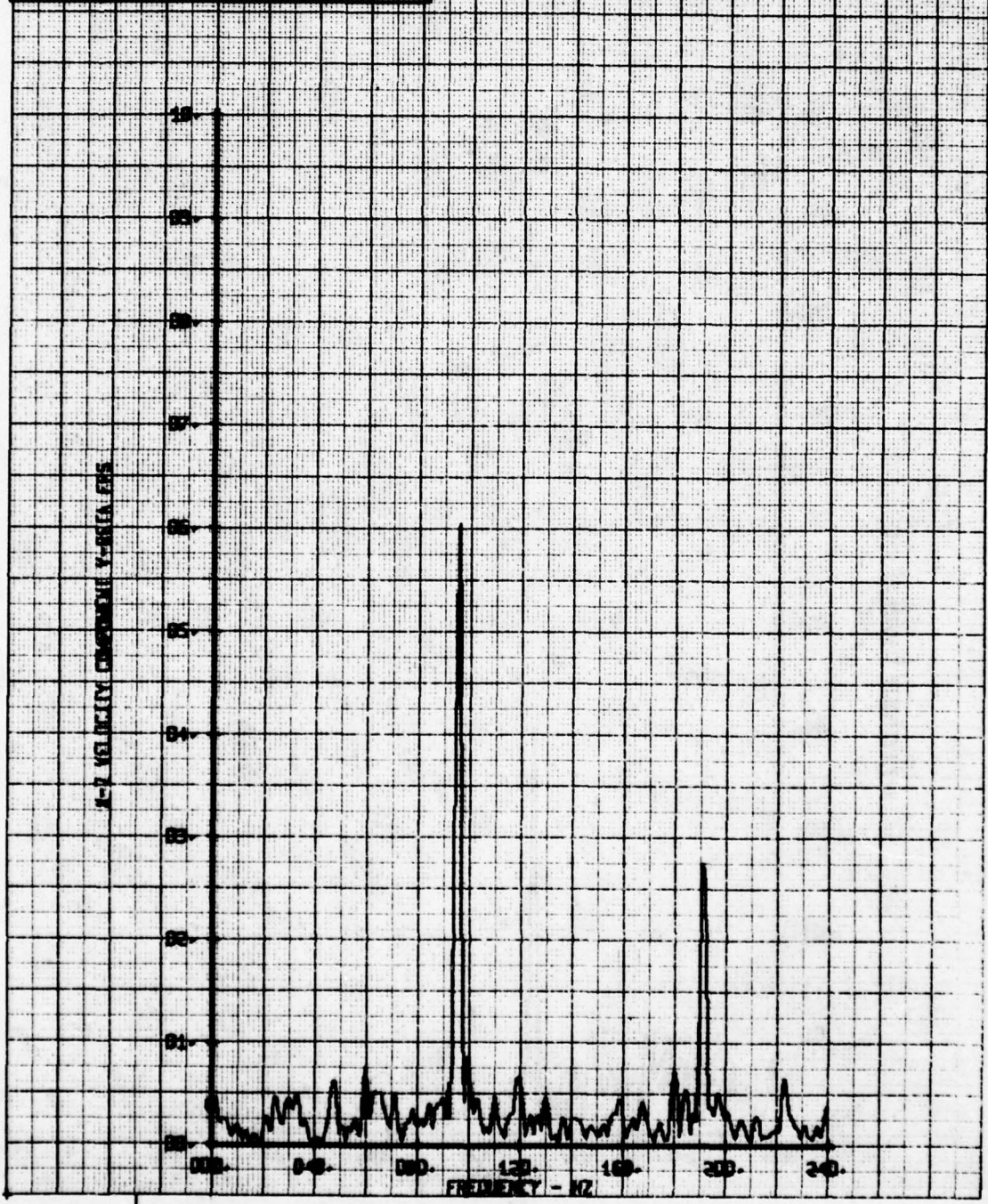
FOR FILM WAVE FREQUENCY ANALYSIS
 NO. 10 000-7-001A 2-7011-001 P.A.
 RUN 152 TP 10

LEGEND
 CH PARAMETER
 00 V-DETA



NOT FILM WAVE FREQUENCY ANALYSIS
 SRI ID CAP-7.02TA. 2-12MT. SREY P.A.
 RUN 137 1P 15

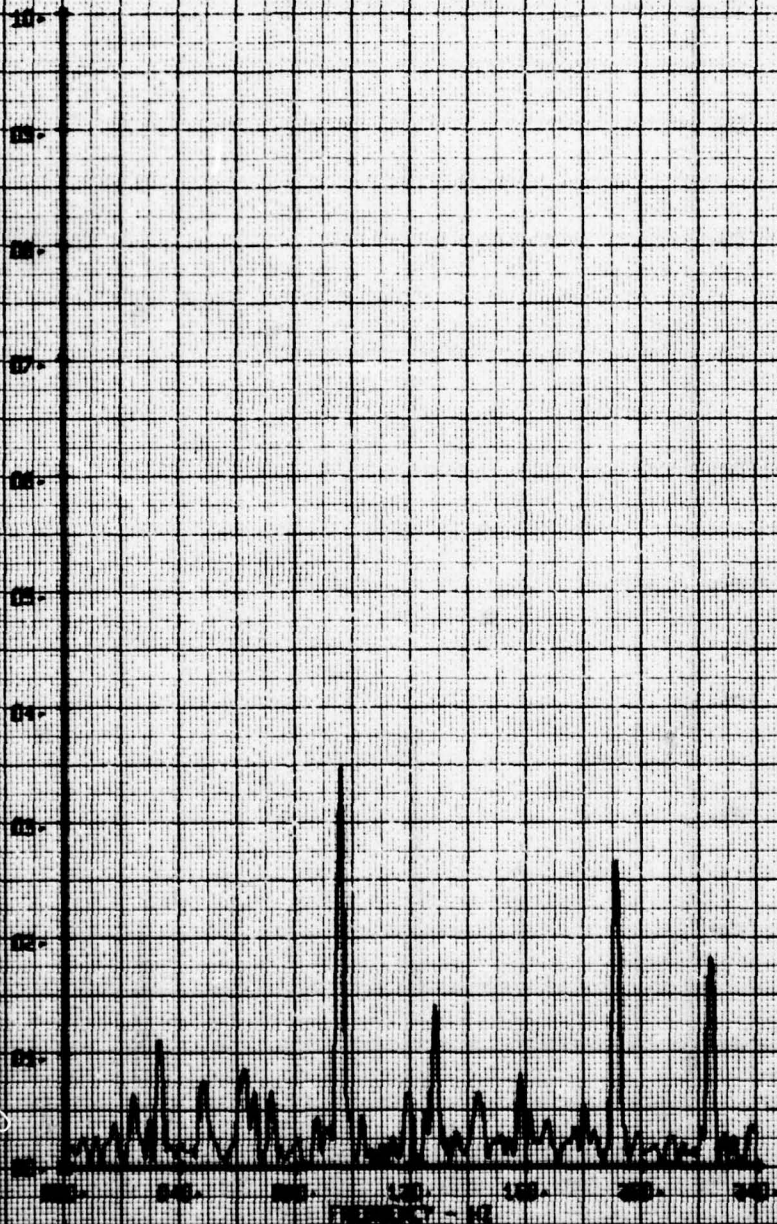
LEGEND
 IN PARAMETER
 MN V-BETA



NOT FILM WIRE FREQUENCY ANALYSIS
 SOLID CAP-7.00TA-2.12HY-50ET P.A.
 RM 137 1P 17

LEGEND
 CH PARAMETER
 66 V-BETA

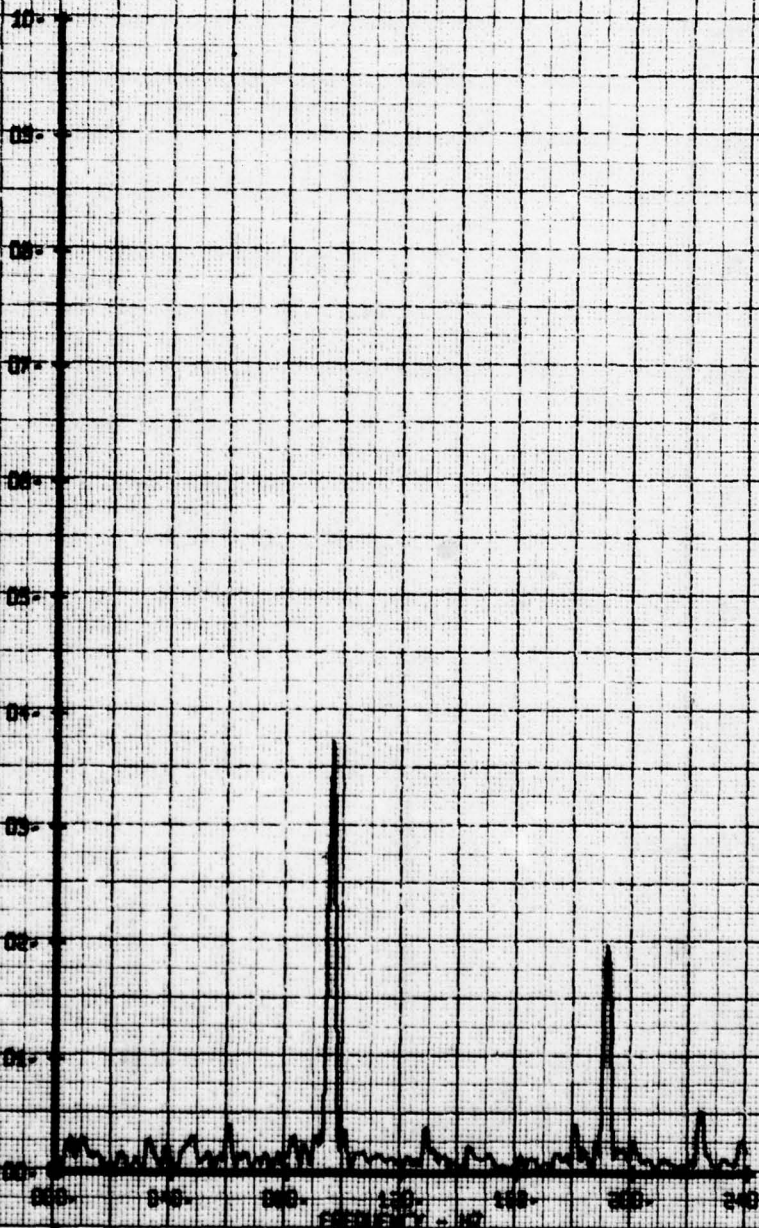
V-BETA COMPONENT V-BETA FREQ

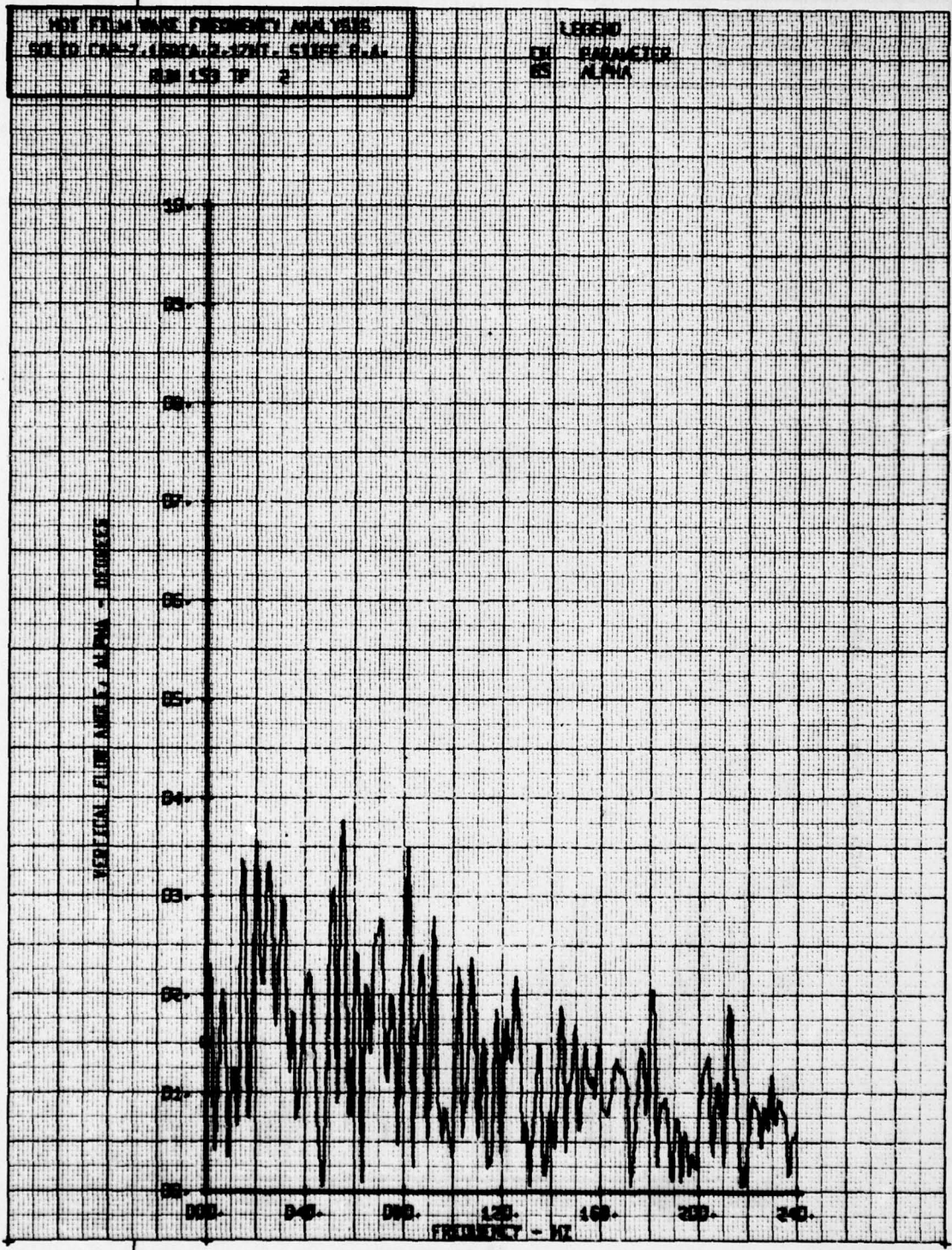


NOT FILM WIRE FREQUENCY ANALYSIS
 SLOTT CAP-2-601A-3-47HT-50FT P.A.
 RUN 137 TP 13

LEGEND
 CH 56 PARAMETER
 V-BETA

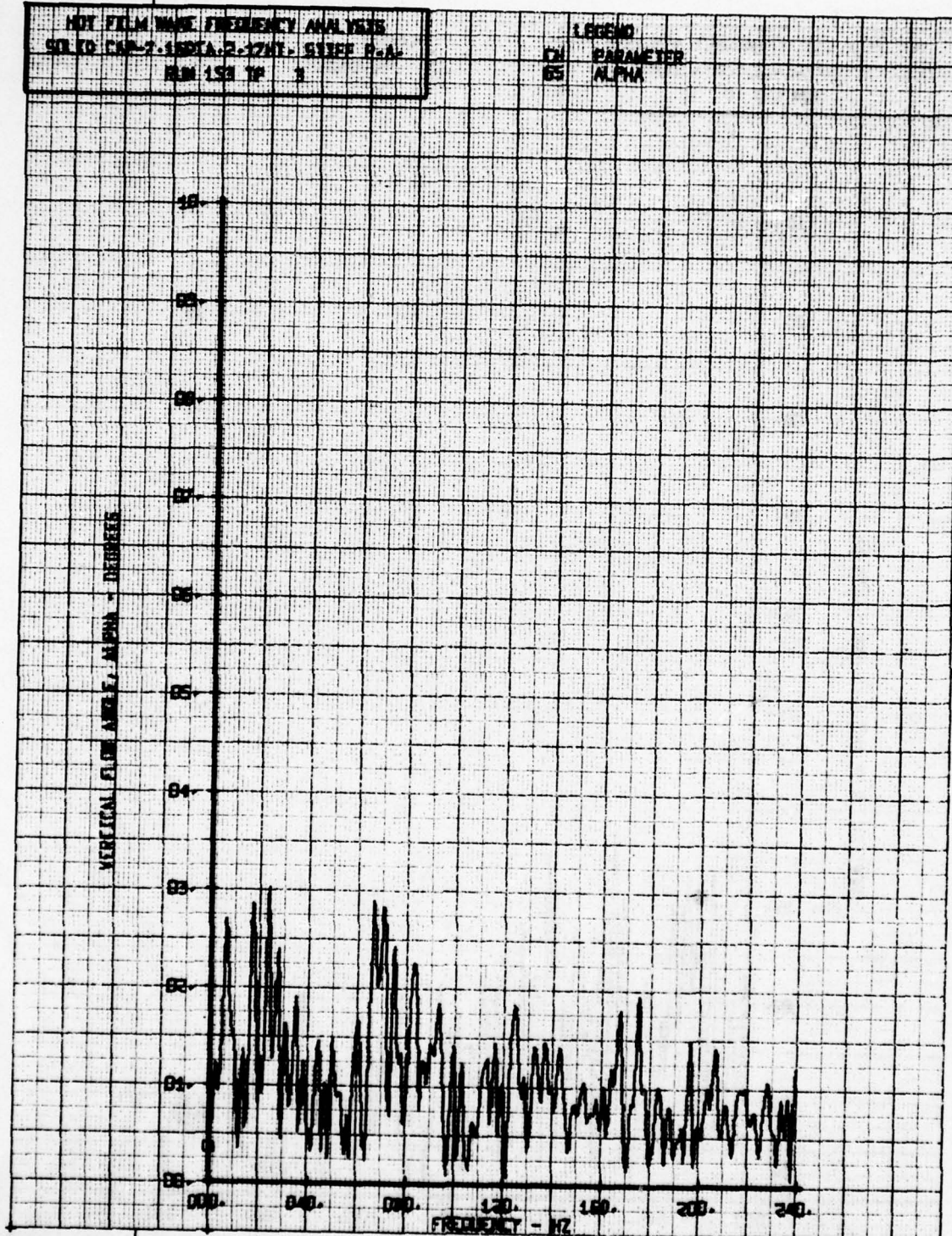
V-BETA





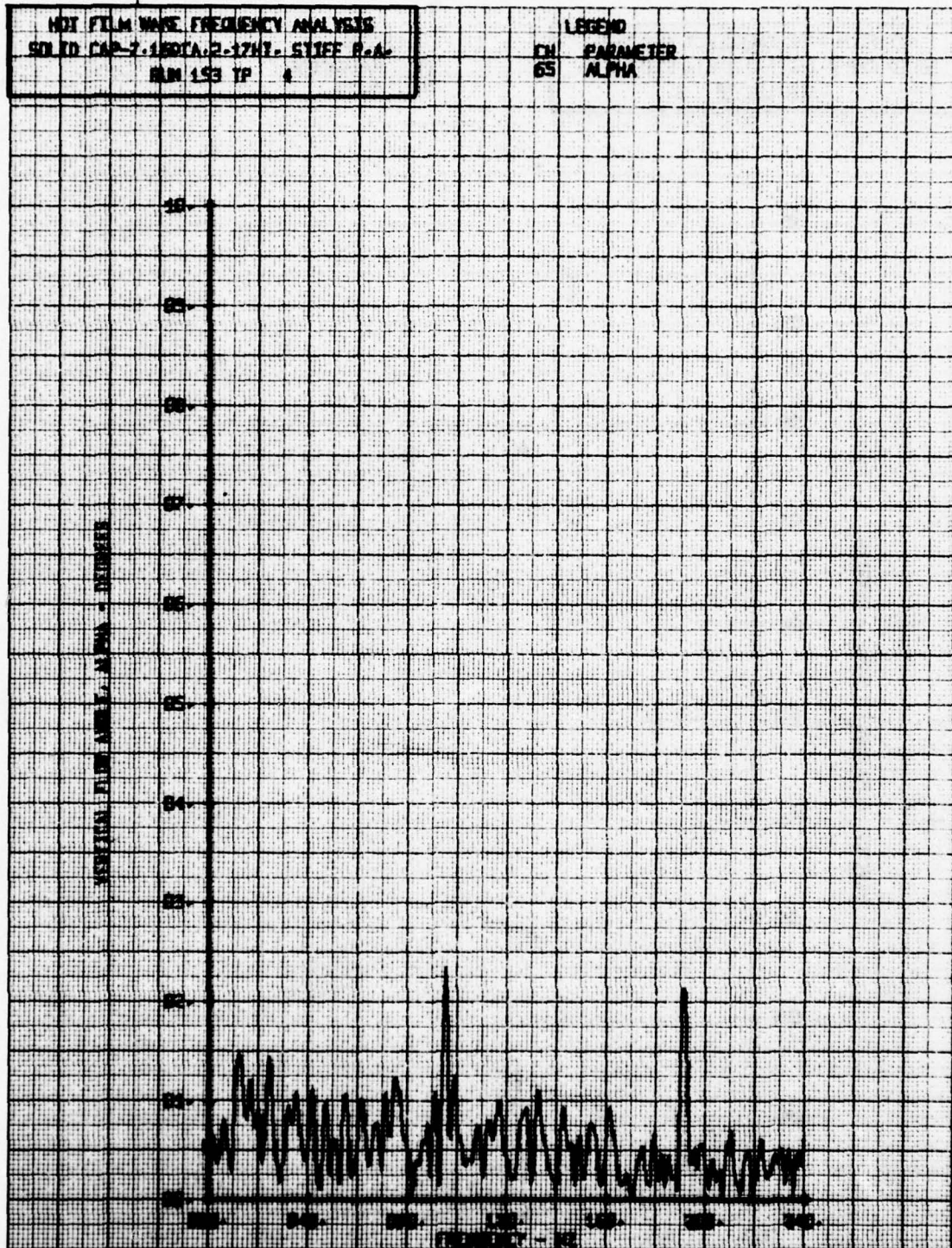
HOT FILM WIRE FREQUENCY ANALYSIS
 S010 CAP-7-1501A-2-17H1-511EF P-A-
 RM 150 TP 1

18860
 CH PARAMETER
 05 ALPHA



HOT FILM WIRE FREQUENCY ANALYSIS
 SOLID CAP-7.150TA.2-17HT, STIFF P.A.
 RUN 153 TP 4

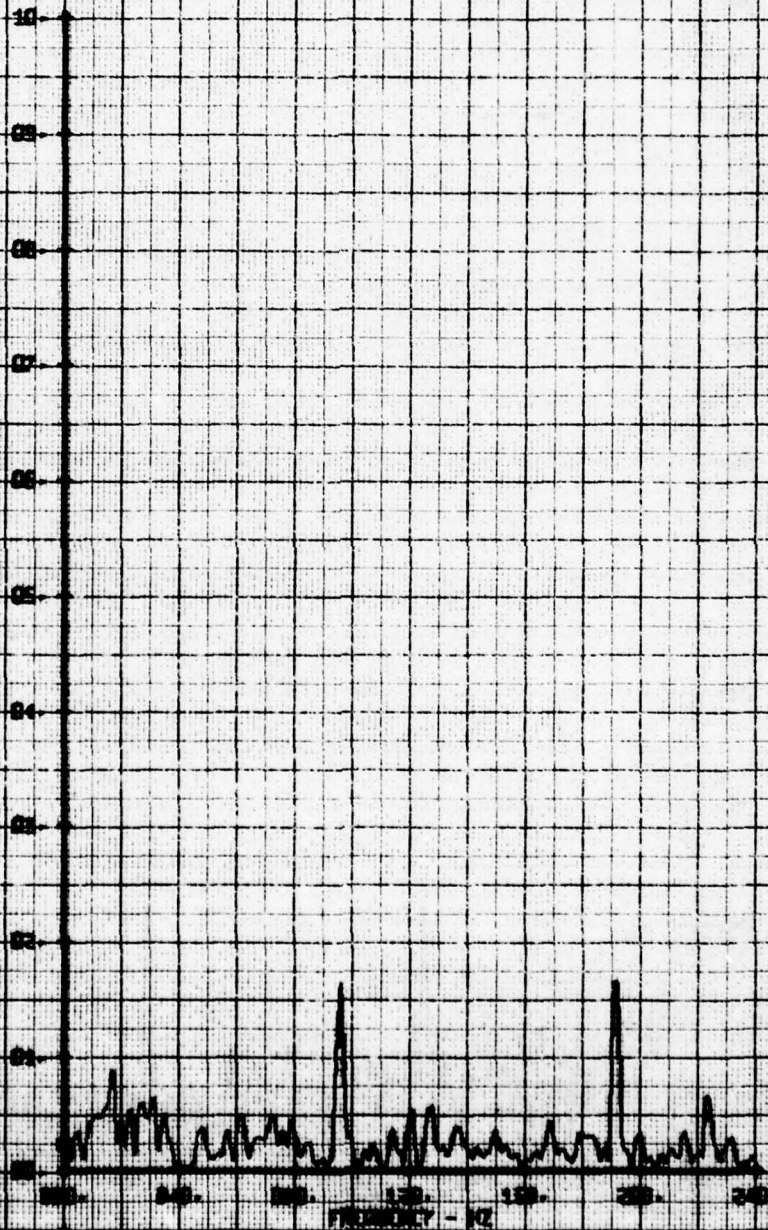
LEGEND
 CH PARAMETER
 65 ALPHA



HOT FILM WAVE FREQUENCY ANALYSIS
 SOLID CAP-7-150(A-2-17H)- STIFF P-A-
 RUN 153 TP 5

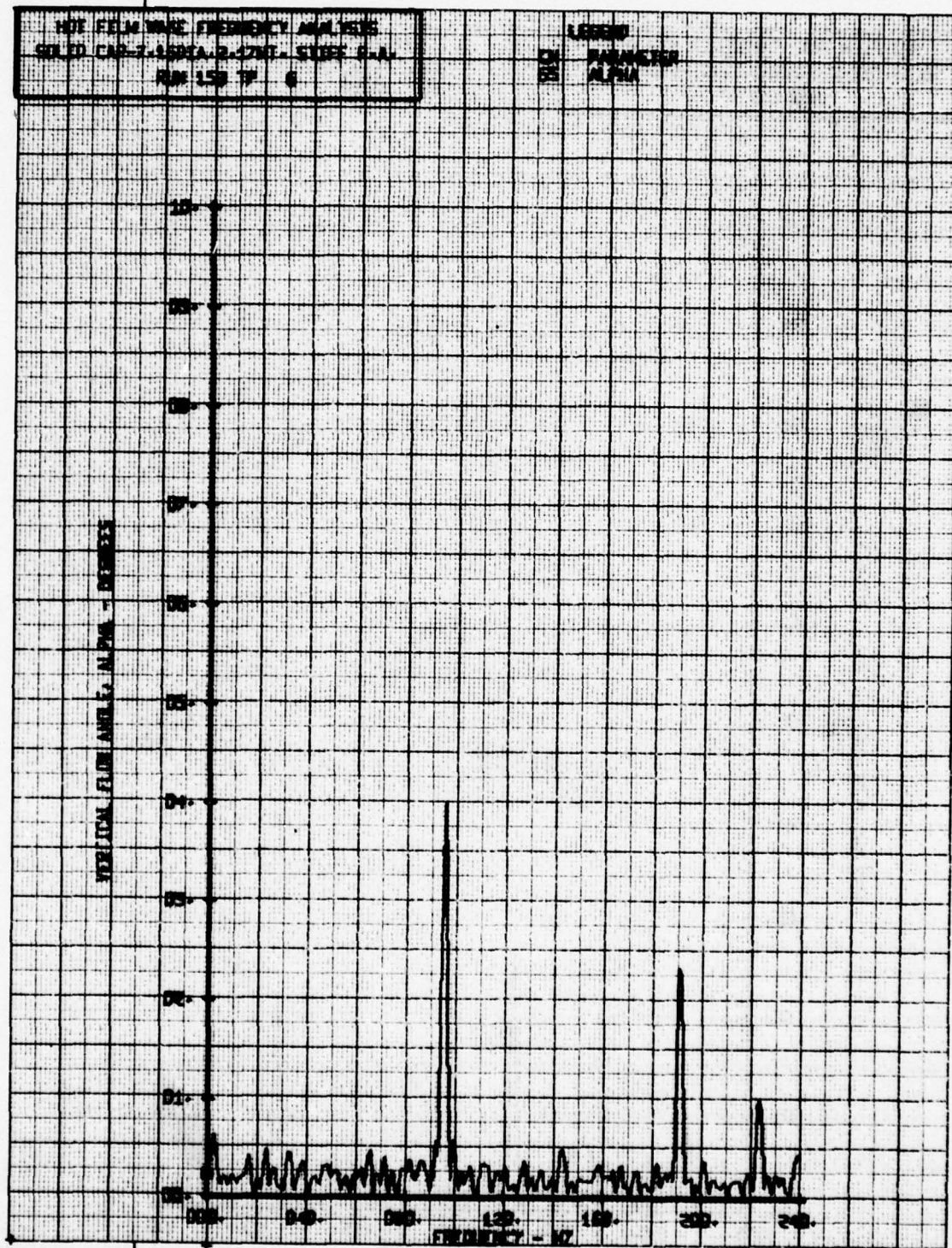
LEGEND
 CH PARAMETER
 65 ALPHA

VERTICAL SLOPE ANGLE - ALPHA - DEGREES



NOI FILM WAVE FREQUENCY ANALYSIS
 GOLD TO CAR-7.150VA.2.070E. CITE: C.A.
 RUN 150 TP 6

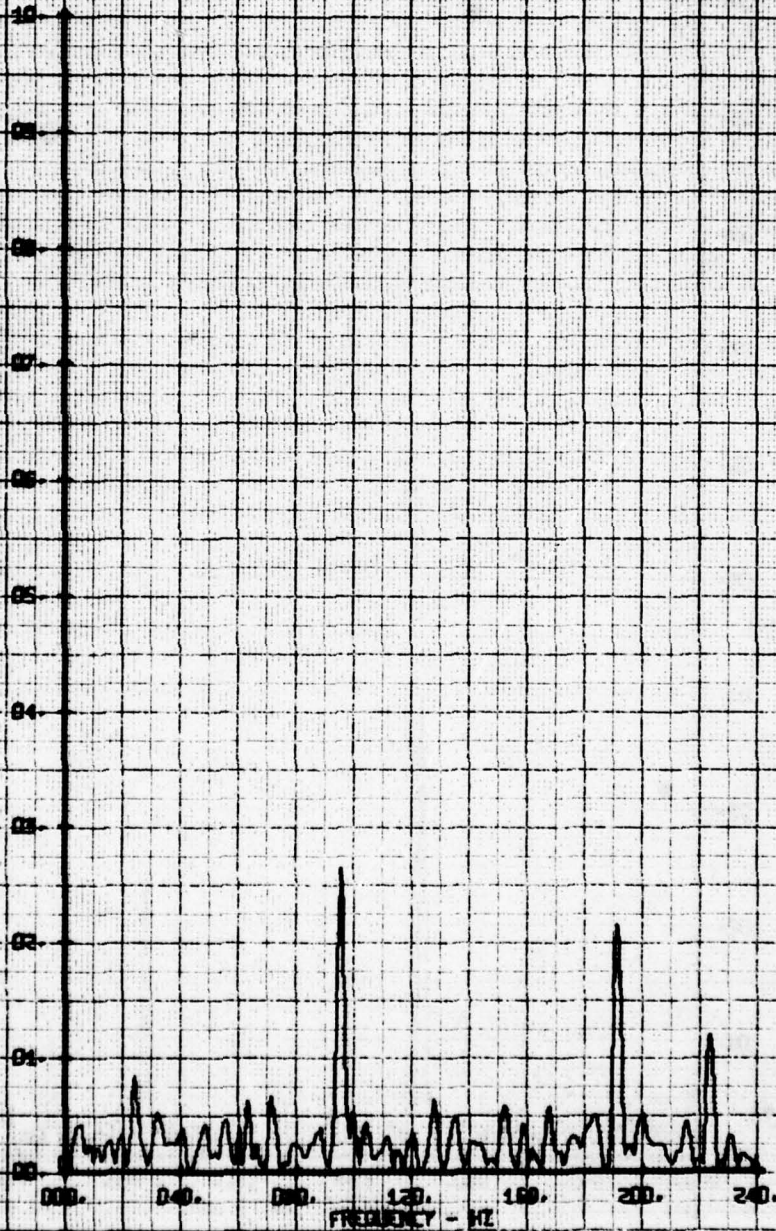
LEGEND
 01 RAINIER
 05 ALMA



HOT FILM WIRE FREQUENCY ANALYSIS
 SOLID CAP-7.1MBTA-2-12MT- STIFF P-A-
 RUN 153 TP 7

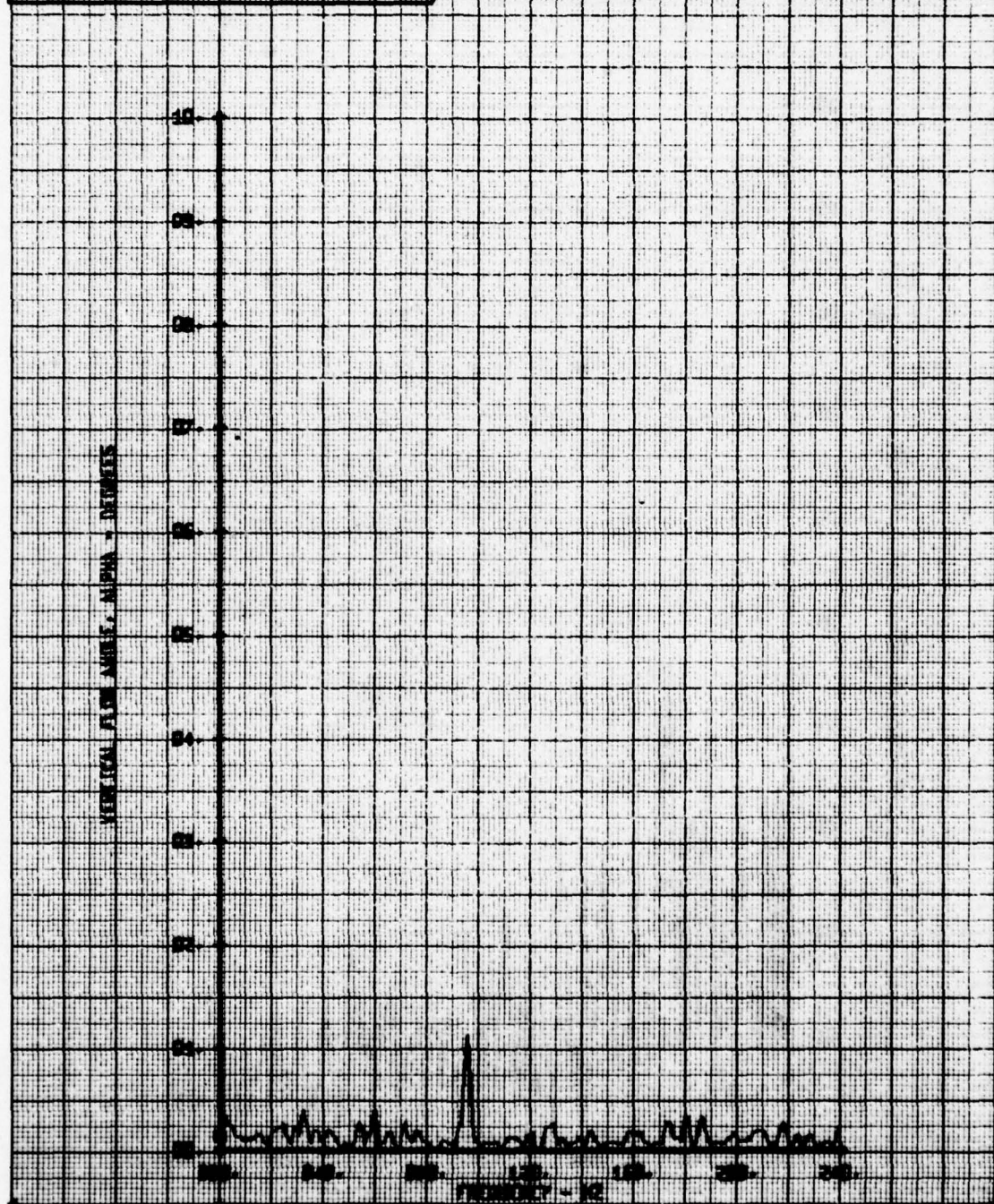
LEGEND
 CH PARAMETER
 05 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WAVE FREQUENCY ANALYSIS
 SOLID CAP-7.16DIA-2.17HT- STIFF P-A-
 RUN 153 TP 8

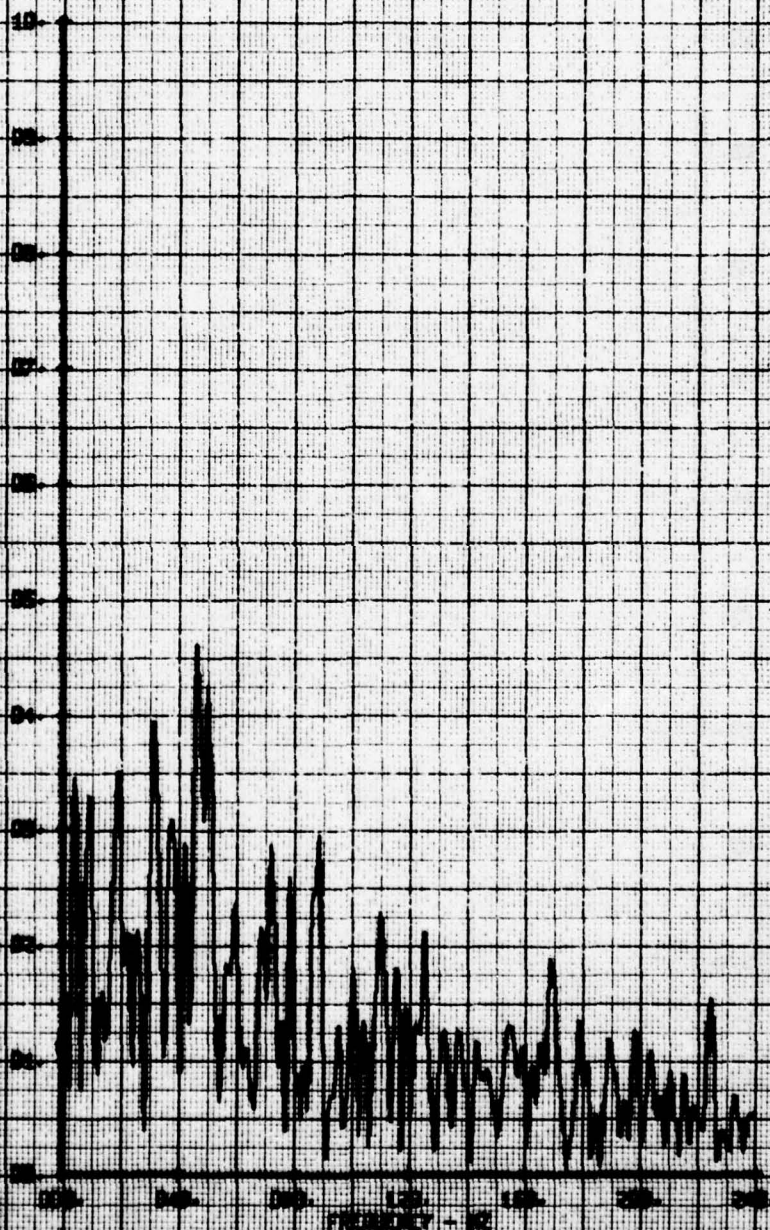
LEGEND
 CH 65
 PARAMETER ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
 SOLID CAP-7-150TA-2-12MT- STIFF P-A-
 RUN 158 TP 2

LEGEND
 CH PARAMETER
 55 DELTA

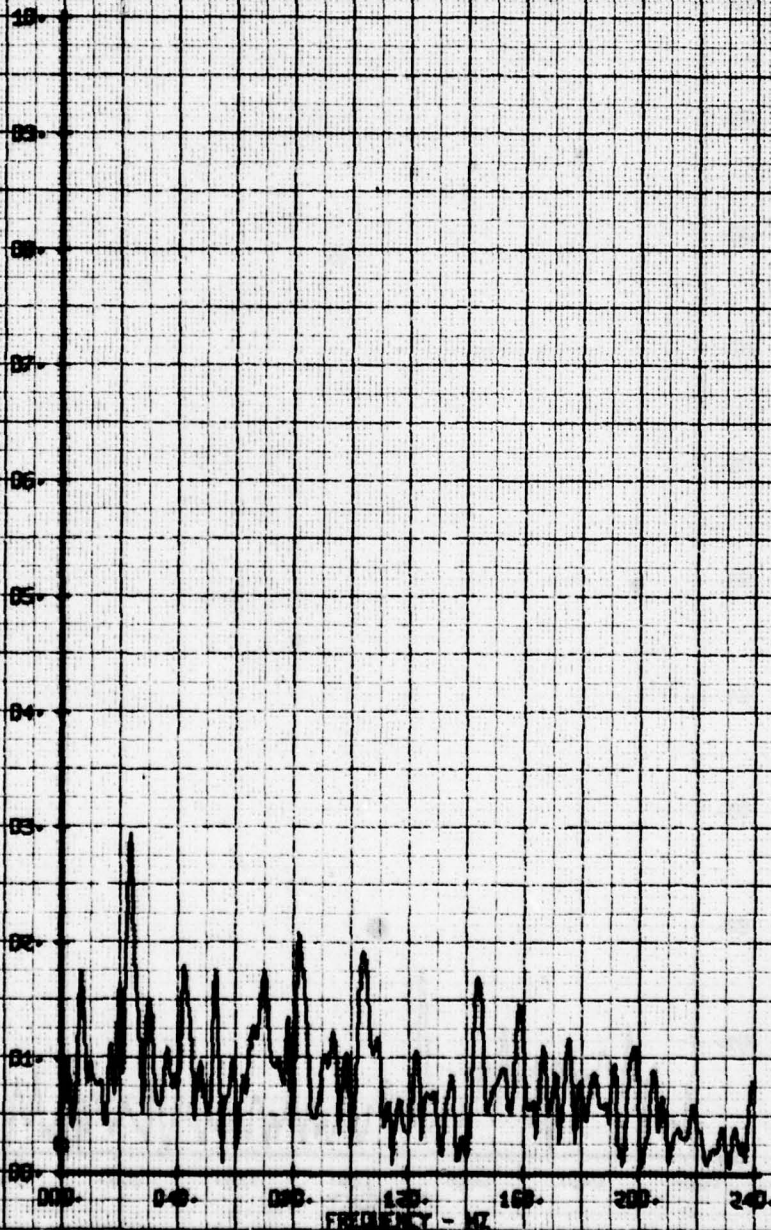
LATENT FILM AMPL. DELTA - DEGREES



HOT FILM WIRE FREQUENCY ANALYSIS
SOLD TO CAP-7.150TA.2-17MT. STIFF P.A.
RM 158 TP 3

LEGEND
CH PARAMETER
BS BETA

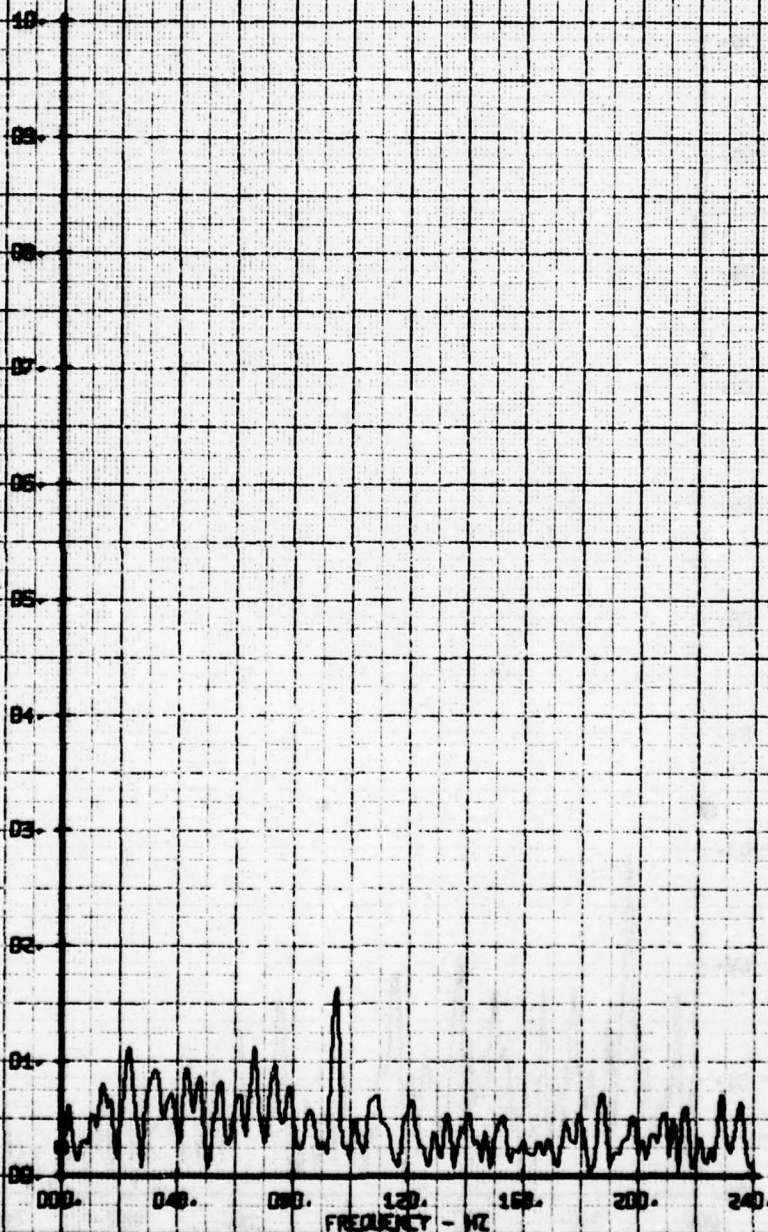
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WIRE FREQUENCY ANALYSIS
 SOLID CAP-7.150TA-2-17MT. STIFF P-A.
 RUN 158 TP 4

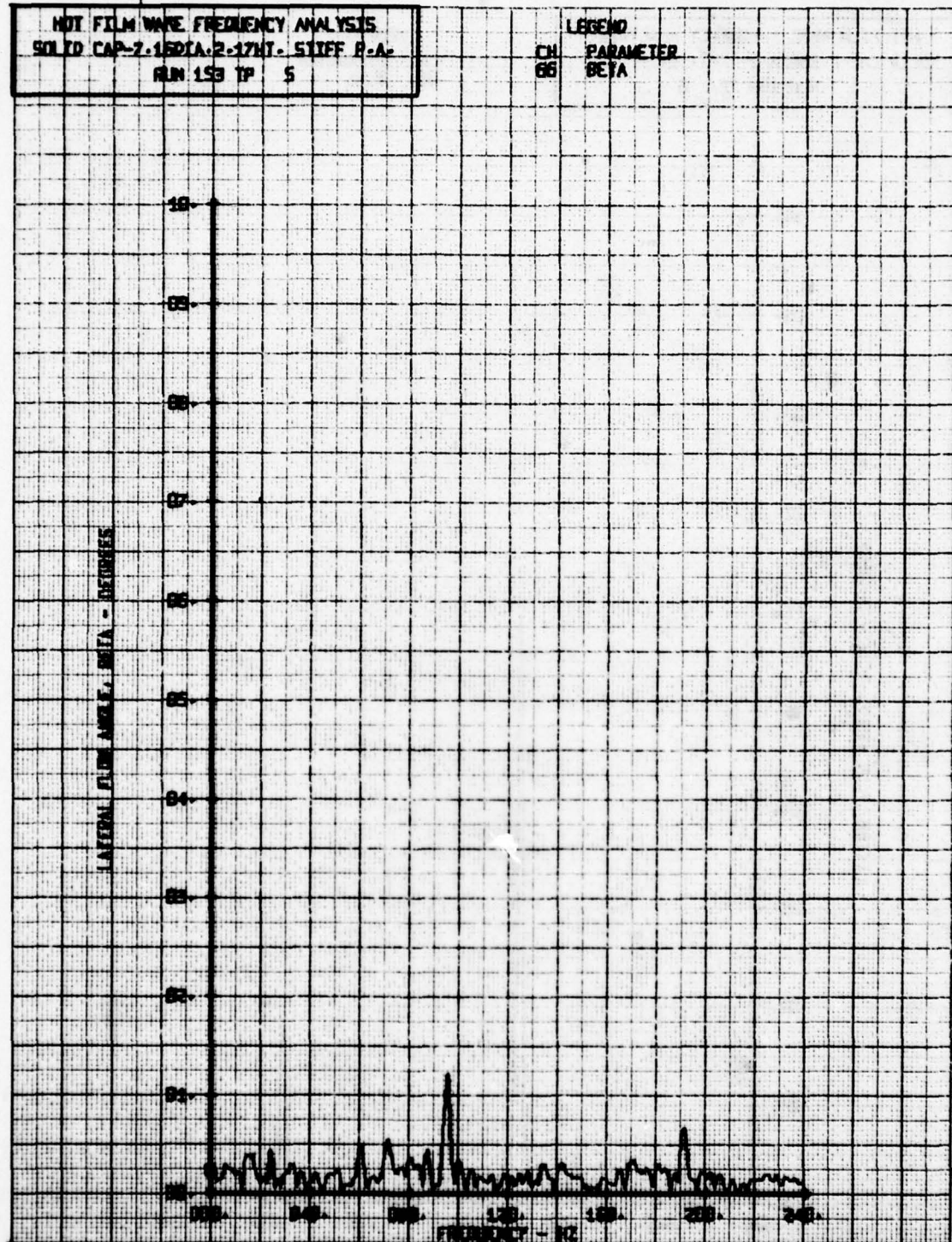
LEGEND
 CH PARAMETER
 06 BETA

LATERAL FIBRE ANGLE, BETA - DEGREES



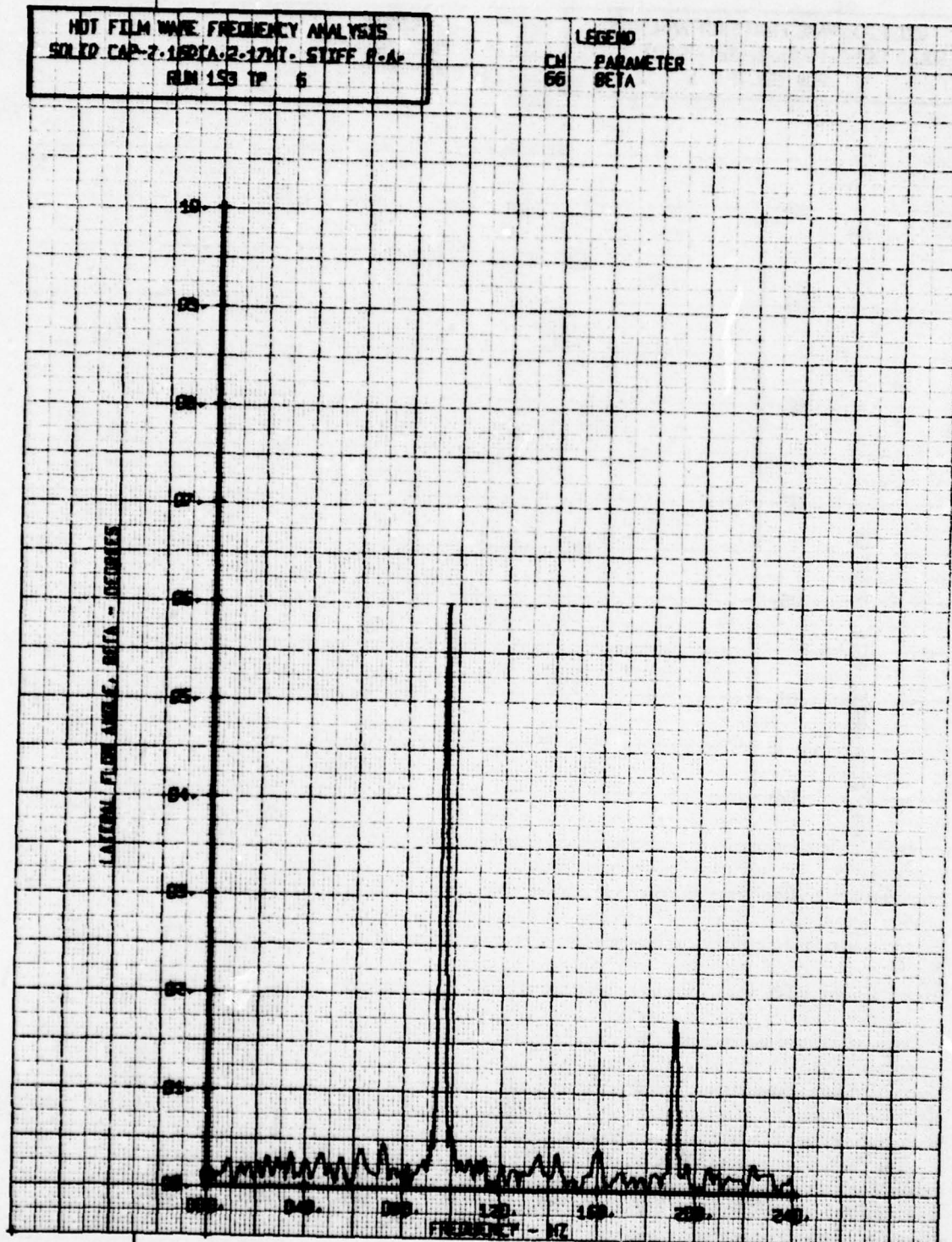
HOT FILM WIRE FREQUENCY ANALYSIS
SOLID CAP-7.15DIA.2-17HT. STIFF P-A.
RUN 153 TP 5

LEGEND
CH PARAMETER
66 BETA



NOT FILM WAVE FREQUENCY ANALYSIS
SOLID CAP-2.1821A-2.17MT. STIFF R-A
RUN 153 TP 6

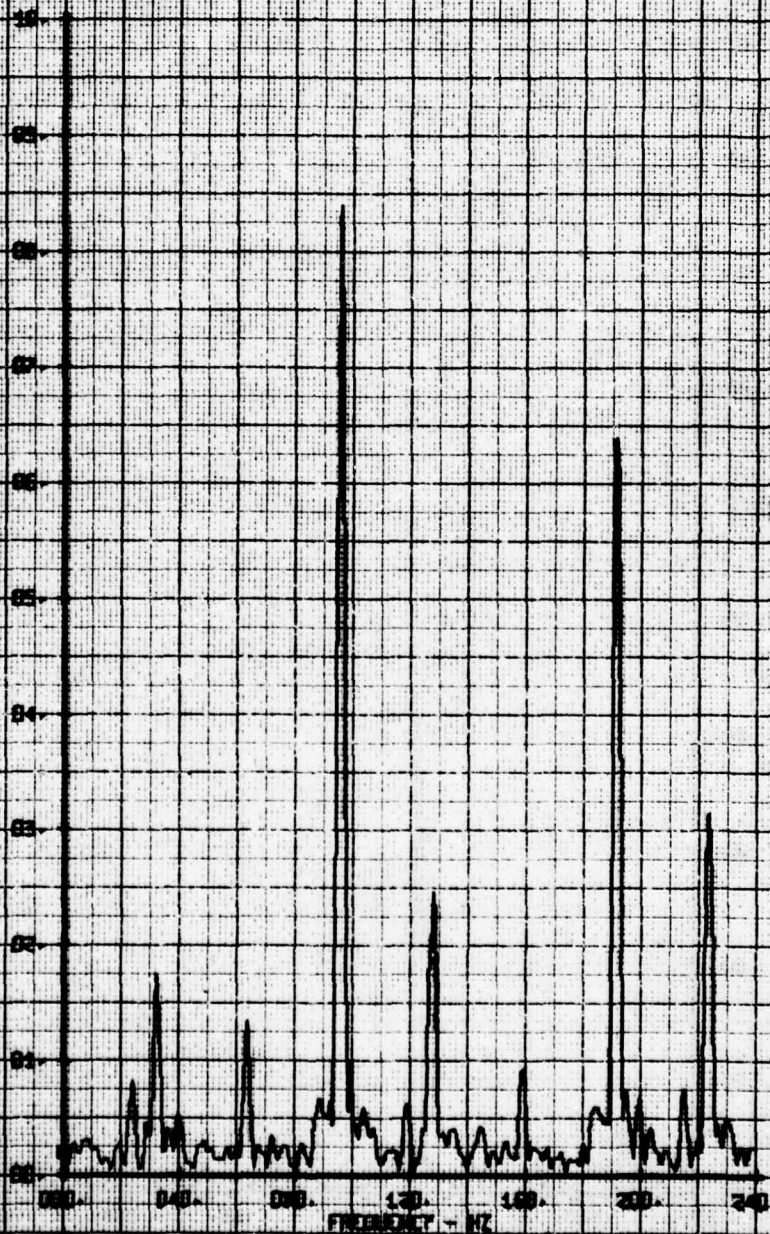
LEGEND
CH 66
PARAMETER
BETA



NOT FILM WAVE FREQUENCY ANALYSIS
 SOLID CAP-7.100TA-2-12MT. STIFF P-A
 RUN 153 TP 7

LEGEND
 CH PARAMETER
 00 BETA

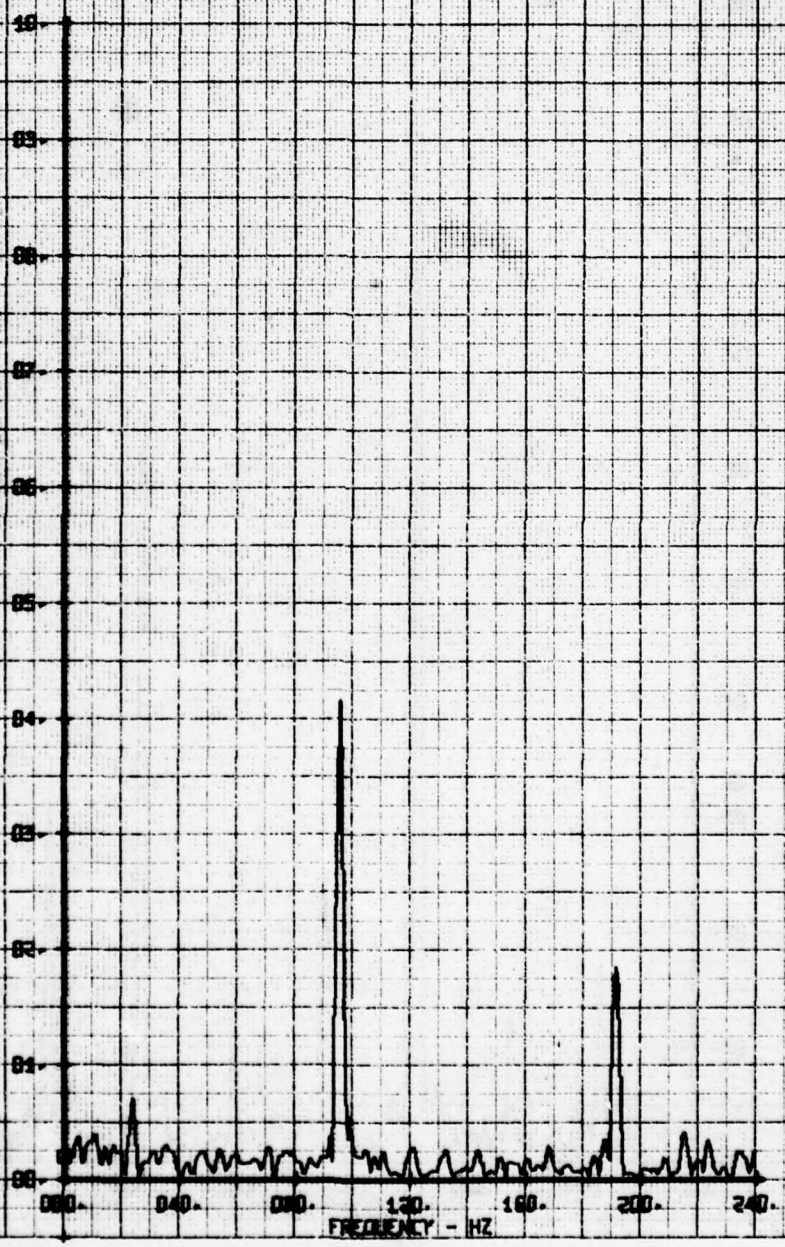
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAVE FREQUENCY ANALYSIS
SOLID CAP-7.160TA-2.17HY. STIFF P.A.
RUN 193 TP 0

LEGEND
CH PARAMETER
66 BETA

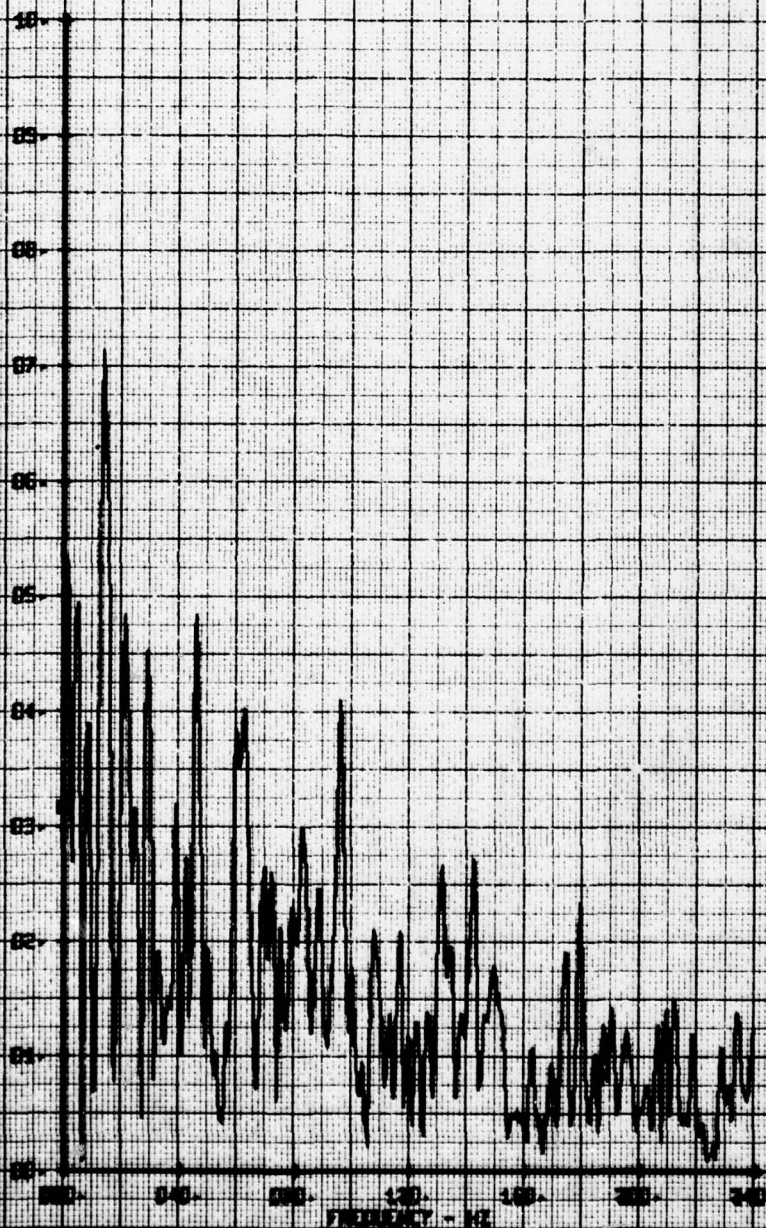
LATERAL FLOW ANGLE, BETA - DEGREES



NOT FILM WAVE FREQUENCY ANALYSIS
 SOLID CAP-7.1601A-2-17HT- STIFF P.A.
 RUN 153 TP 2

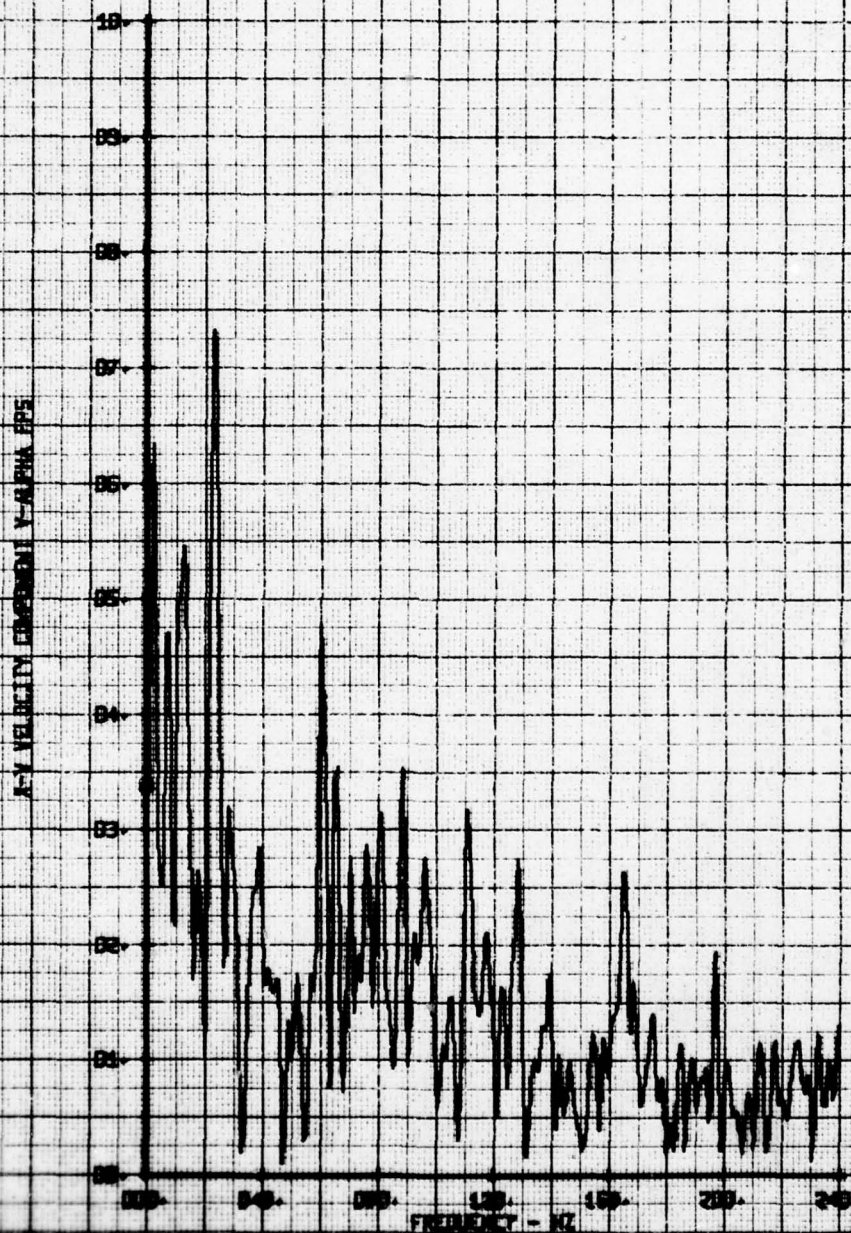
LEGEND
 CH PARAMETER
 65 V-ALPHA

N-V VELOCITY COMPONENT V-ALPHA DBS



NOT FILM WAVE FREQUENCY ANALYSIS
 SOLID CAP-2.18DIA. 2.12MT. STIFF P-A.
 RUN 153 TP 3

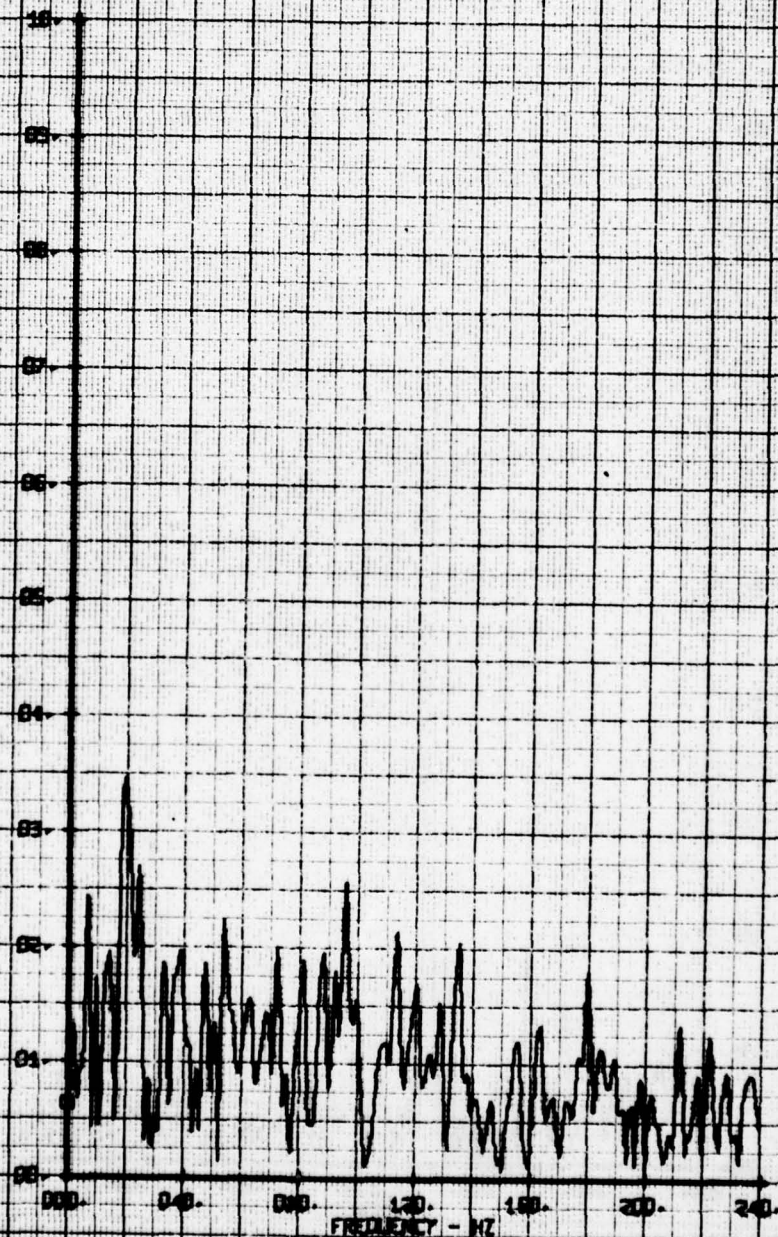
LEGEND
 CH PARAMETER
 DS V-ALPHA



HIF FILM WAVE FREQUENCY ANALYSIS
 SOLID CAP-7.1001A-2-17MT. STIFF R-A.
 RUN 153 IF

LEGEND
 CH PARAMETER
 B5 V-ALPHA

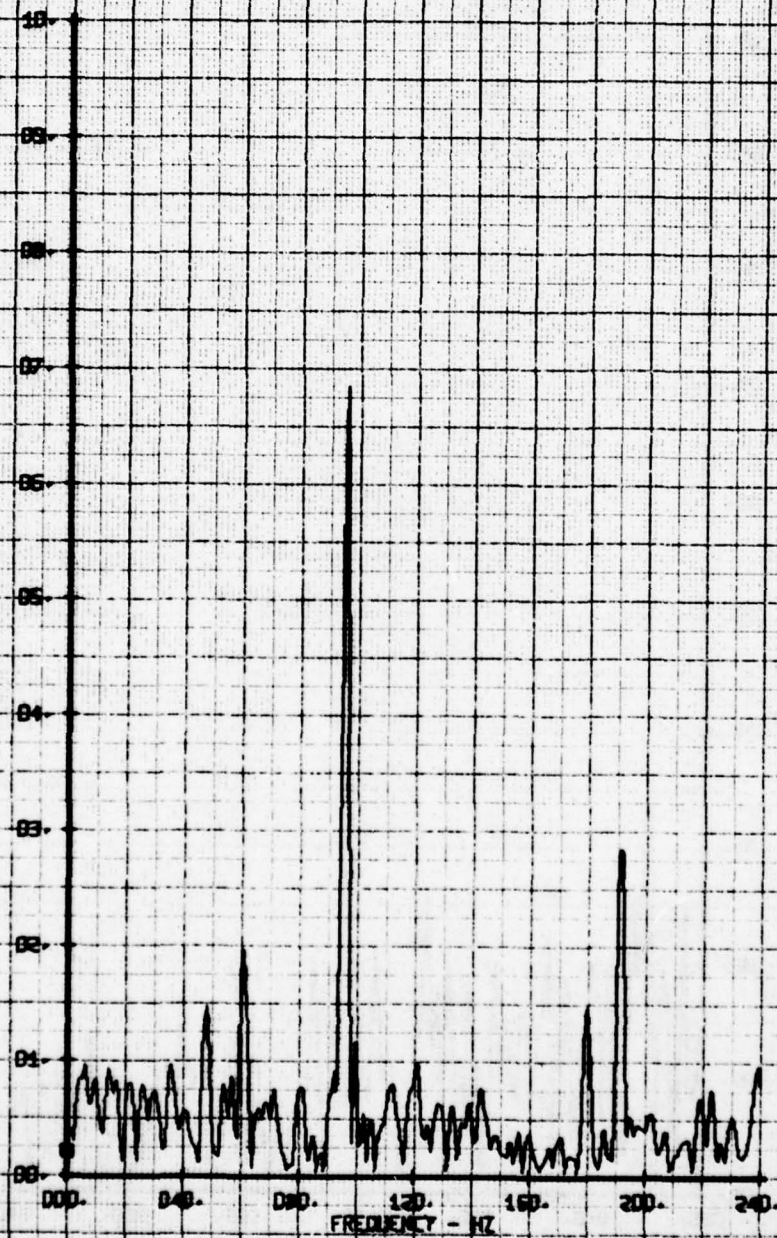
V-ALPHA VELOCITY COMPONENT V-ALPHA RMS



HOT FILM WAKE FREQUENCY ANALYSIS
 SOLID CAP-2.15DTA.2-17MT. STIFF R-A.
 RUN 153 TP 5

LEGEND
 CH PARAMETER
 05 V-ALPHA

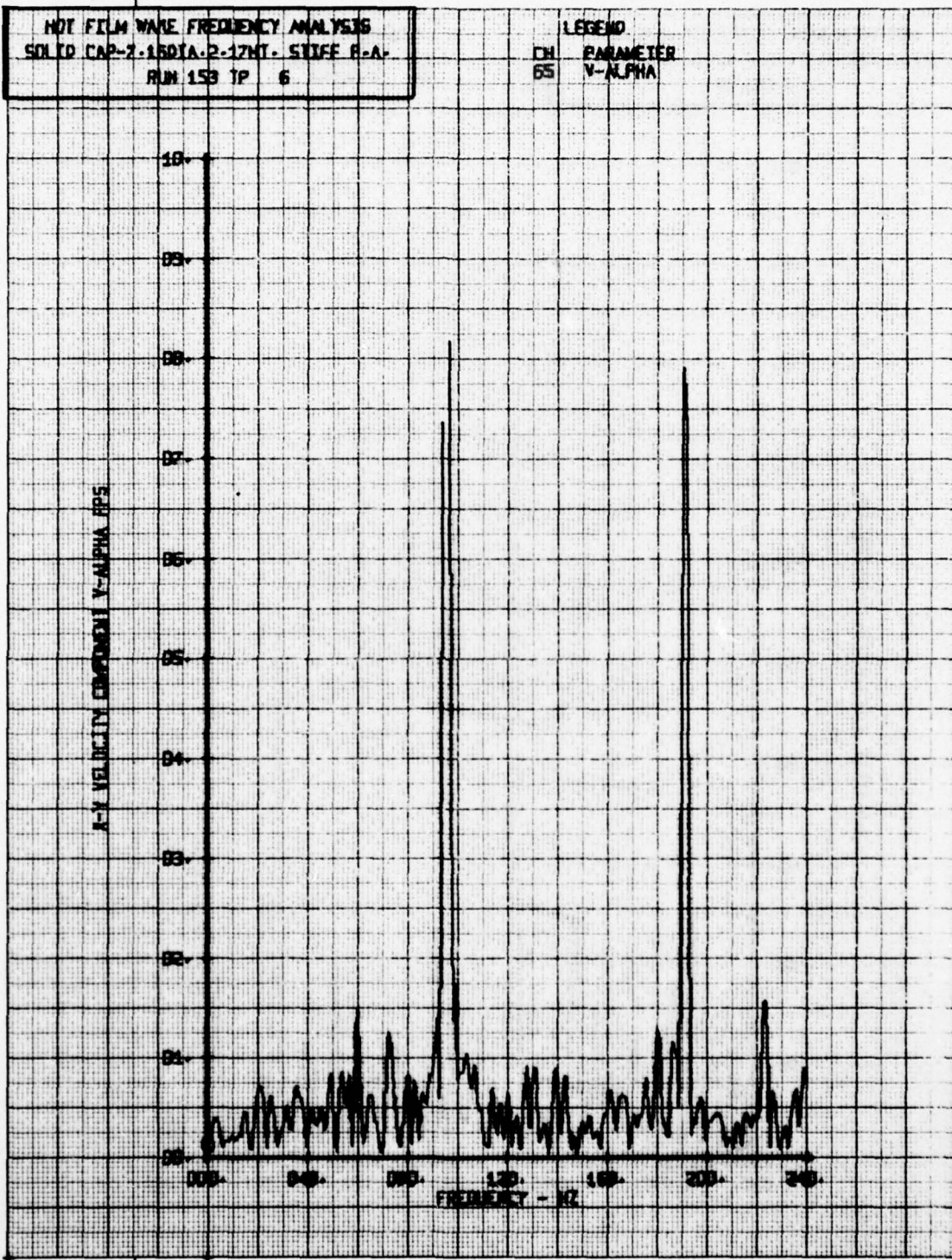
A-X VELOCITY COMPONENT V-ALPHA FPS



NOT FILM WAVE FREQUENCY ANALYSIS
 SOL ID CAP-7.1501A.2-17MT. STIFF P-A.
 RUN 153 TP 6

LEGEND
 CH PARAMETER
 65 V-ALPHA

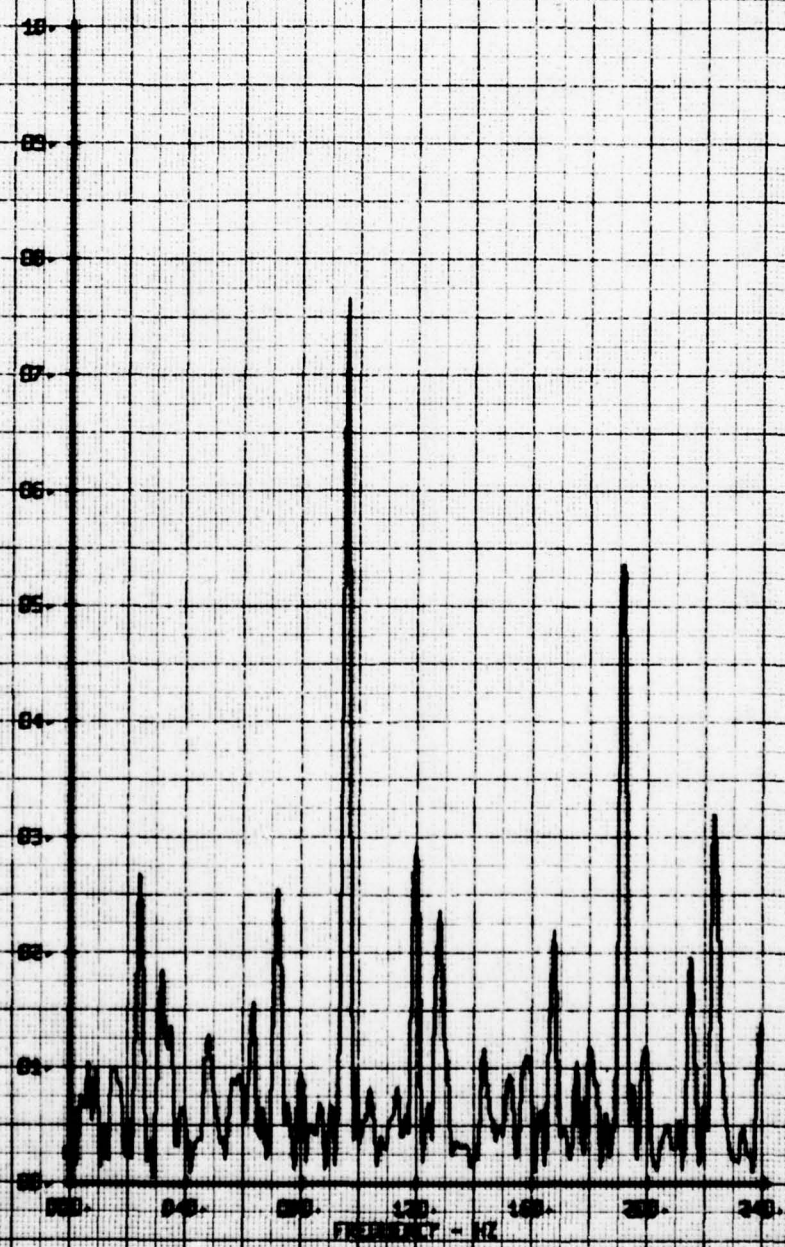
A-Y VELOCITY COMPONENT V-ALPHA FPS



NOT FILM WAVE FREQUENCY ANALYSIS
 SOLID CAP-2.18DIA-2.17HI- STIFF R-A.
 RUN 153 TP 7

LEGEND
 CH 65
 PARAMETER
 V-ALPHA

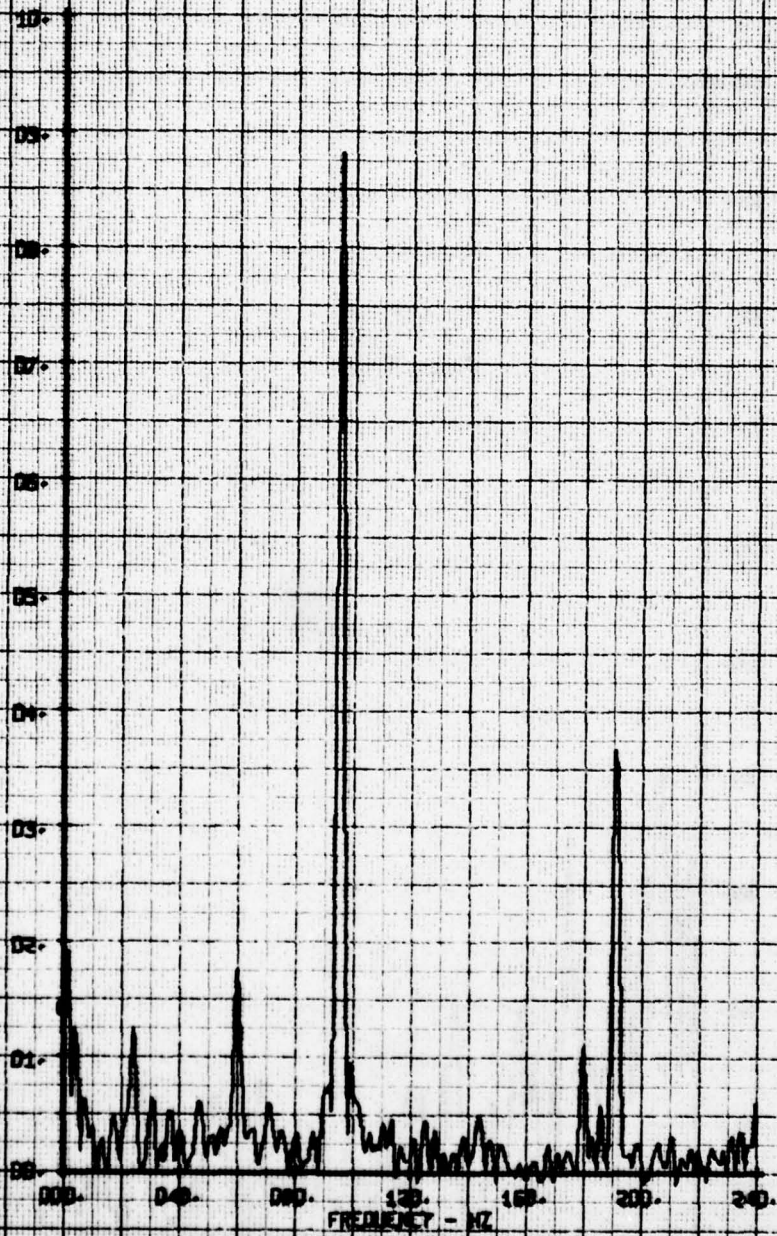
X-Y VELOCITY COMPONENT V-ALPHA EPS



HOT FILM WAVE FREQUENCY ANALYSIS
 SOLID CAP-2-1001A-2-12MT. STEFF R-A.
 RUN 153 TP 2

LEGEND
 CH PARAMETER
 B5 V-ALPHA

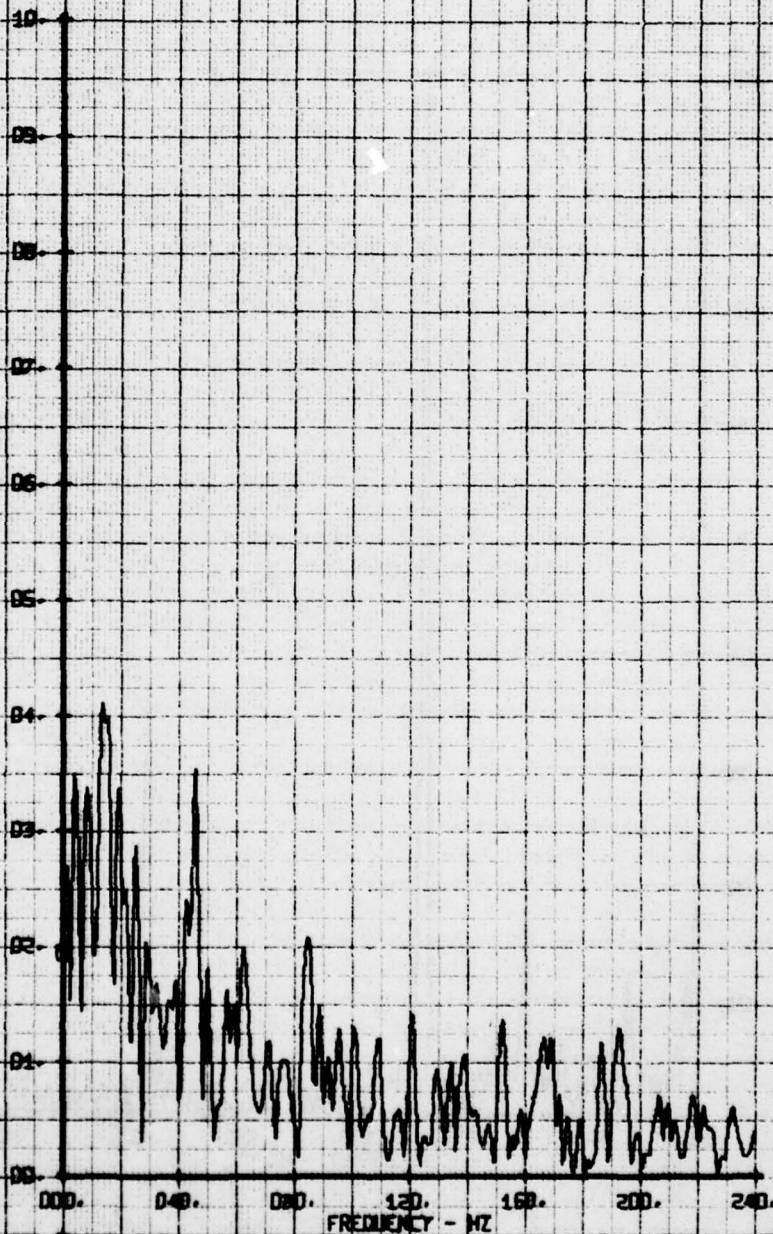
R-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAVE FREQUENCY ANALYSIS
 SOLID CAP-7.150KA-2-12MT. STIFF P-A-
 RUN 153 TP 2

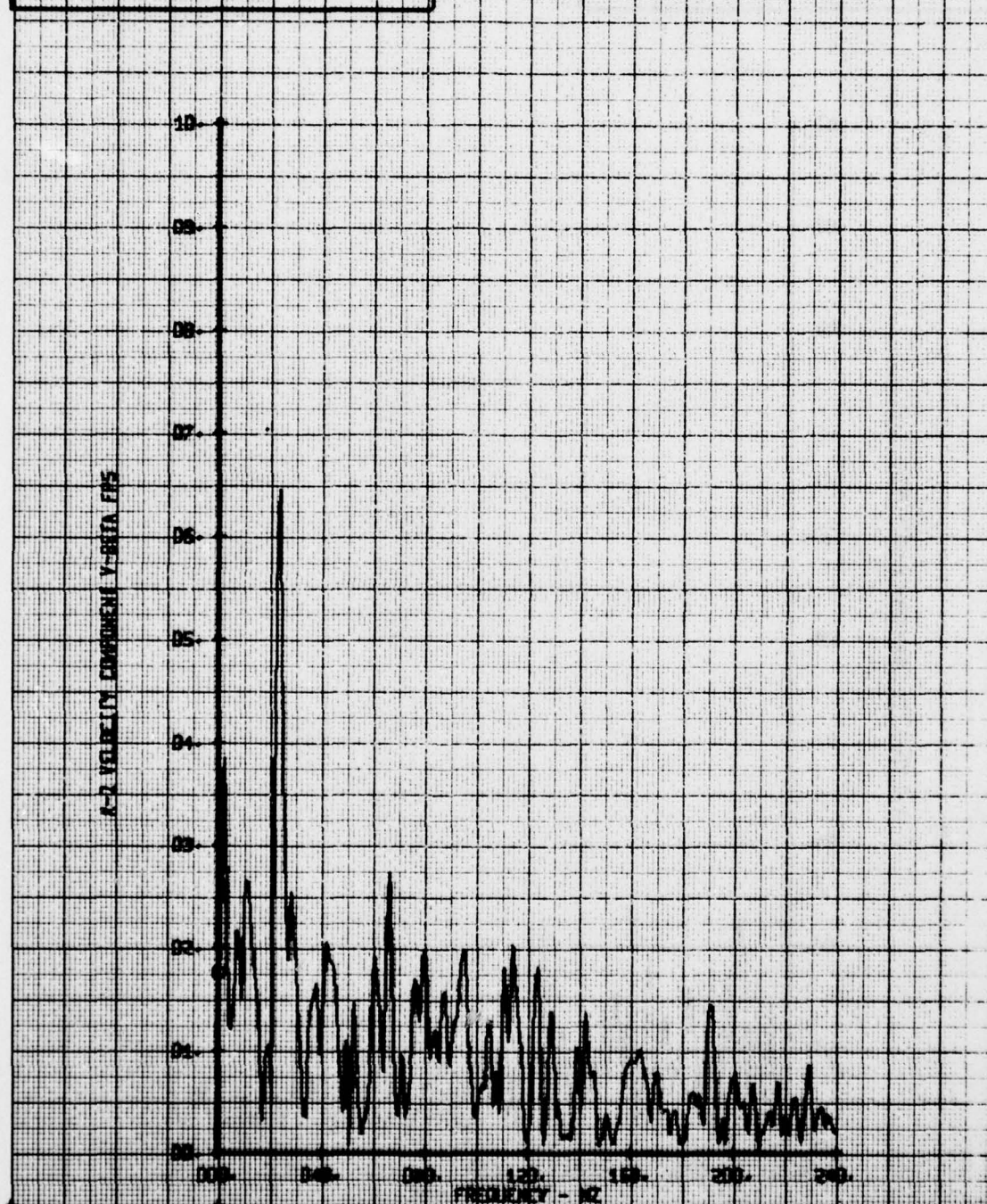
LEGEND
 CM PARAMETER
 66 V-BETA

A-2 VELOCITY COMPONENT V-BETA FPS



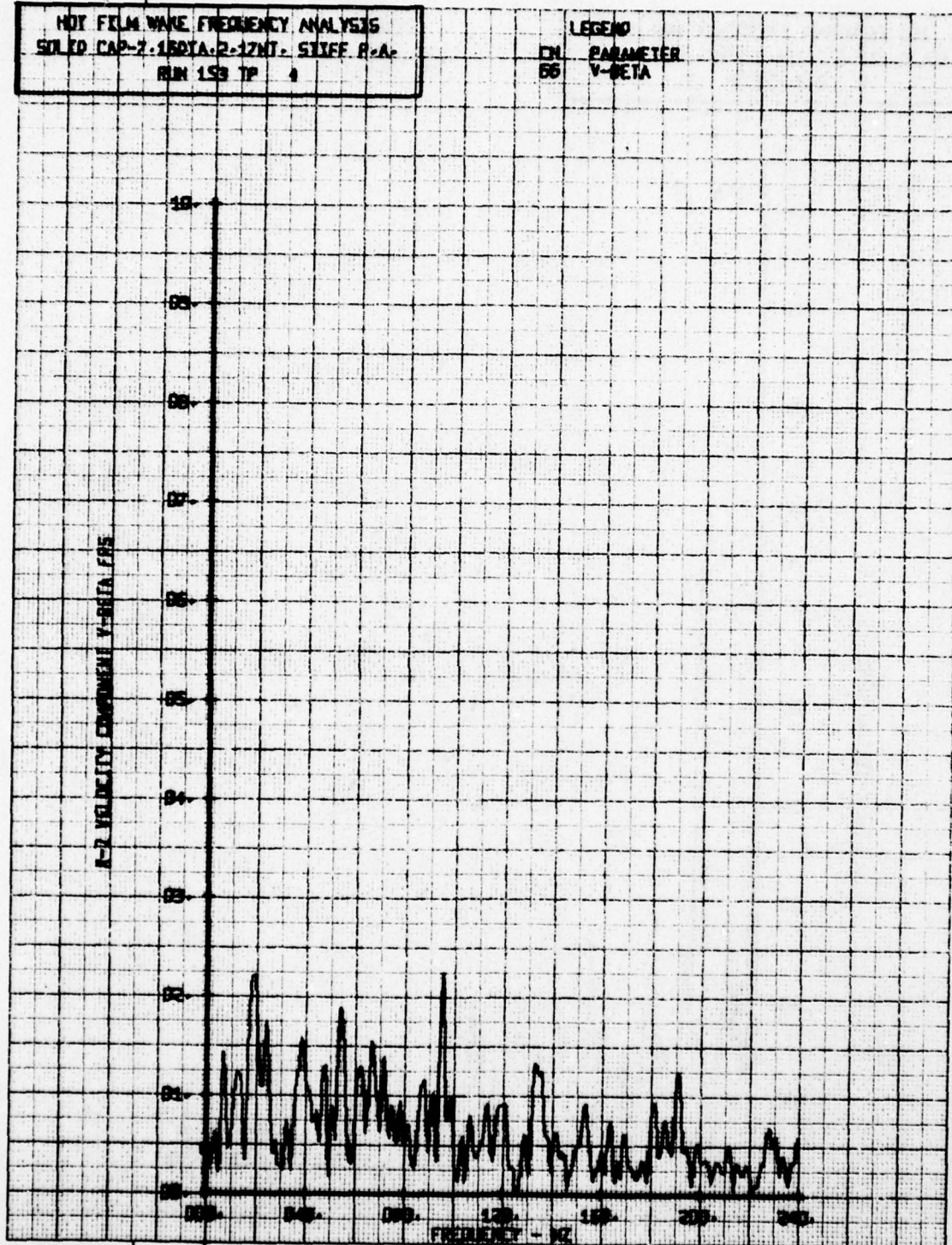
HOT FILM WAVE FREQUENCY ANALYSIS
SOLID CAP-7-15DIA-2-12HT- STIFF R-A-
RUN 153 TP 3

LEGEND
CH PARAMETER
55 V-BETA



NOY FILM WAVE FREQUENCY ANALYSIS
SOLID CAP-2.150TA-2.12MT. STIFF R-A.
RUN 153 TP 4

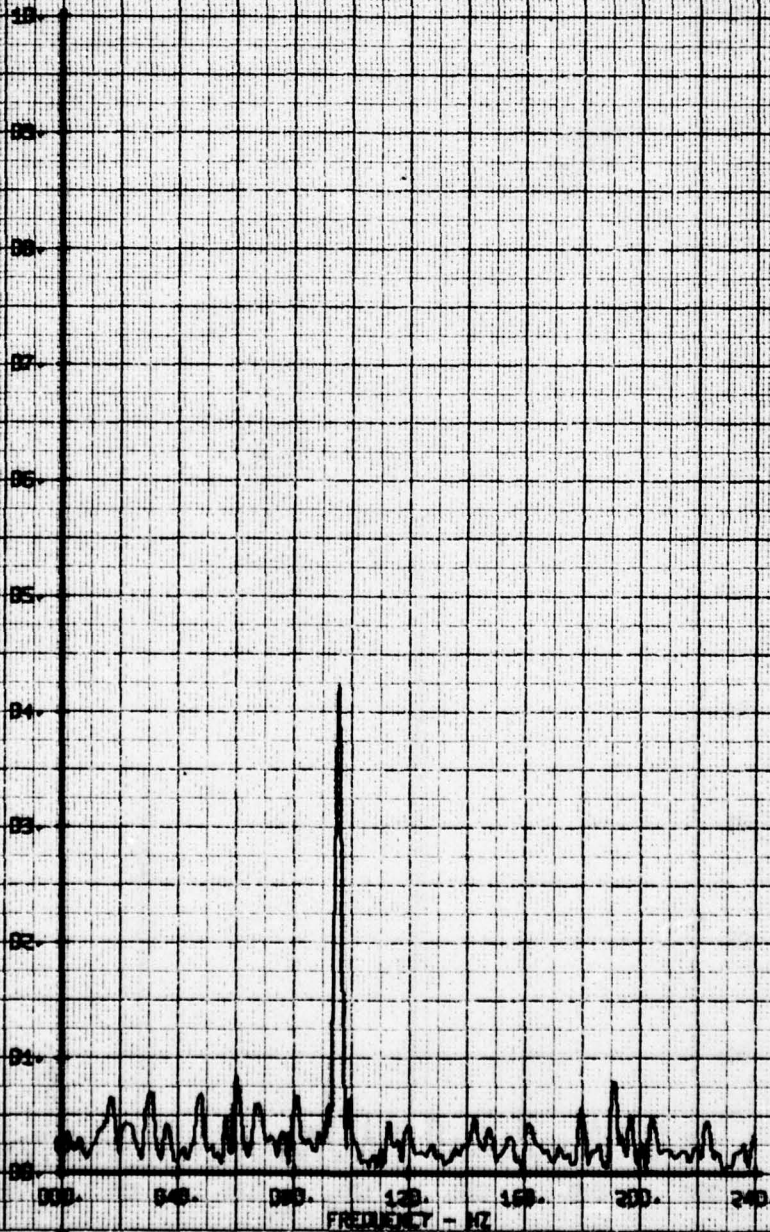
LEGEND
CN PARAMETER
56 V-BETA



HOY FILM WAVE FREQUENCY ANALYSIS
 GOLF CAP-2.180TA.2.17MT. STIFF R.A.
 RUN 153 TP 5

LEGEND
 CH PARAMETER
 SS V-BETA

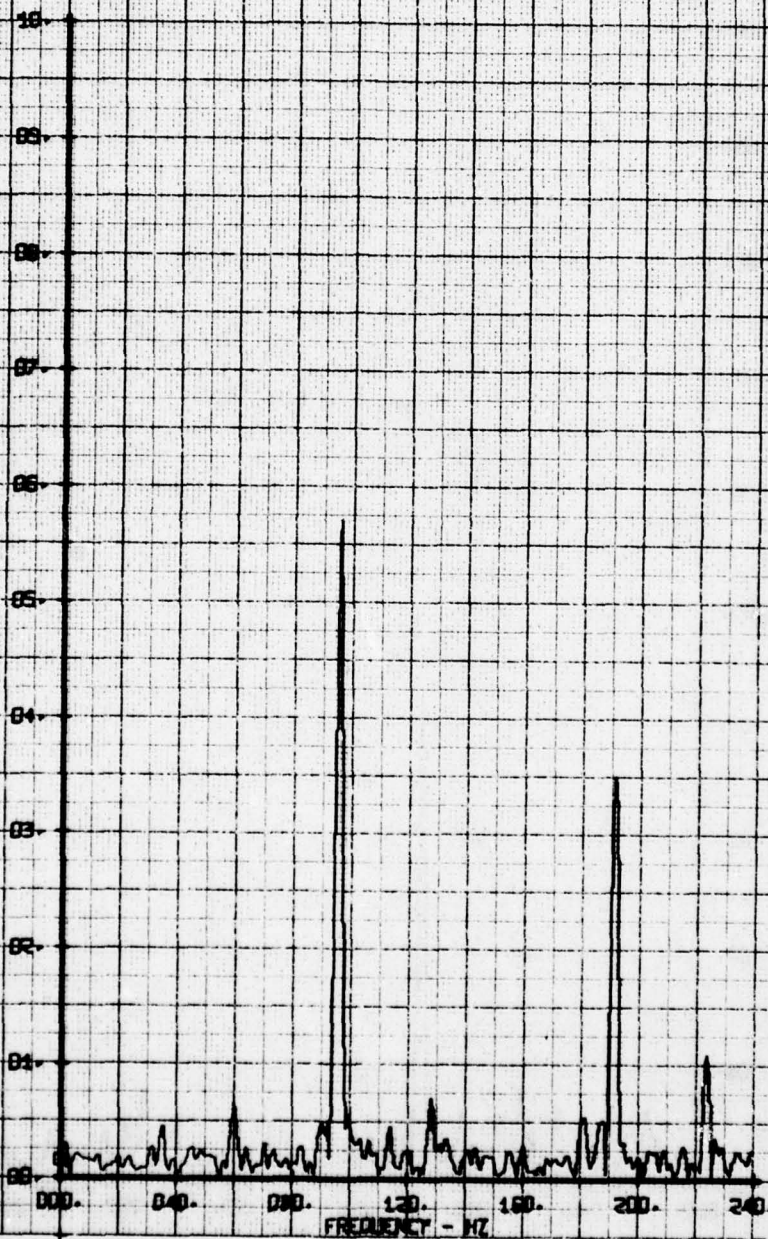
A-2 VELOCITY COMPONENT V-BETA.FRS



HOT FILM WAVE FREQUENCY ANALYSIS
 SOLID CAP-2.150TA-2-17MT-511EE R-A-
 RUN 153 TP 6

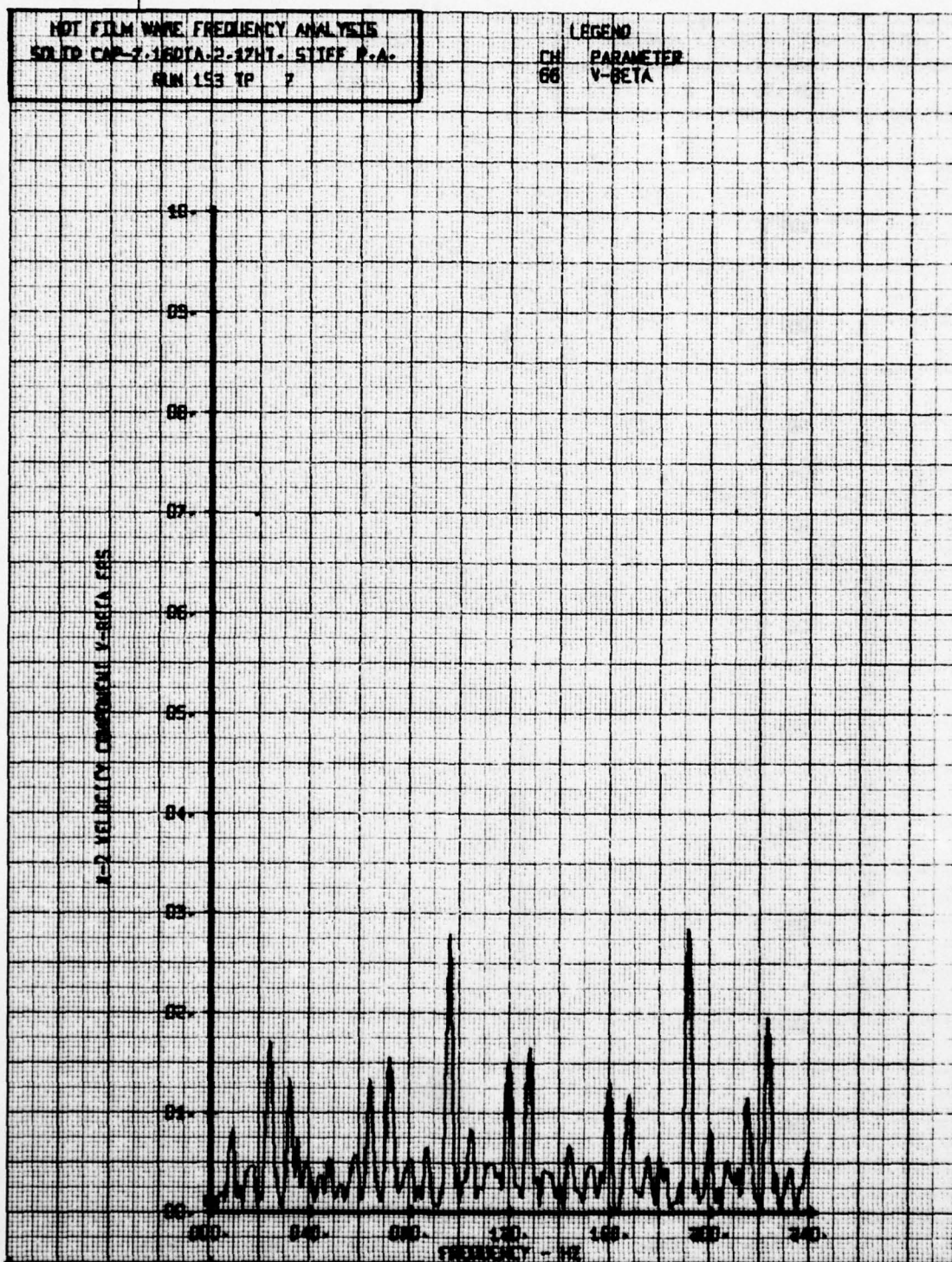
LEGEND
 CH PARAMETER
 06 V-BETA

A-D VELOCITY COMPONENT V-BETA FRS



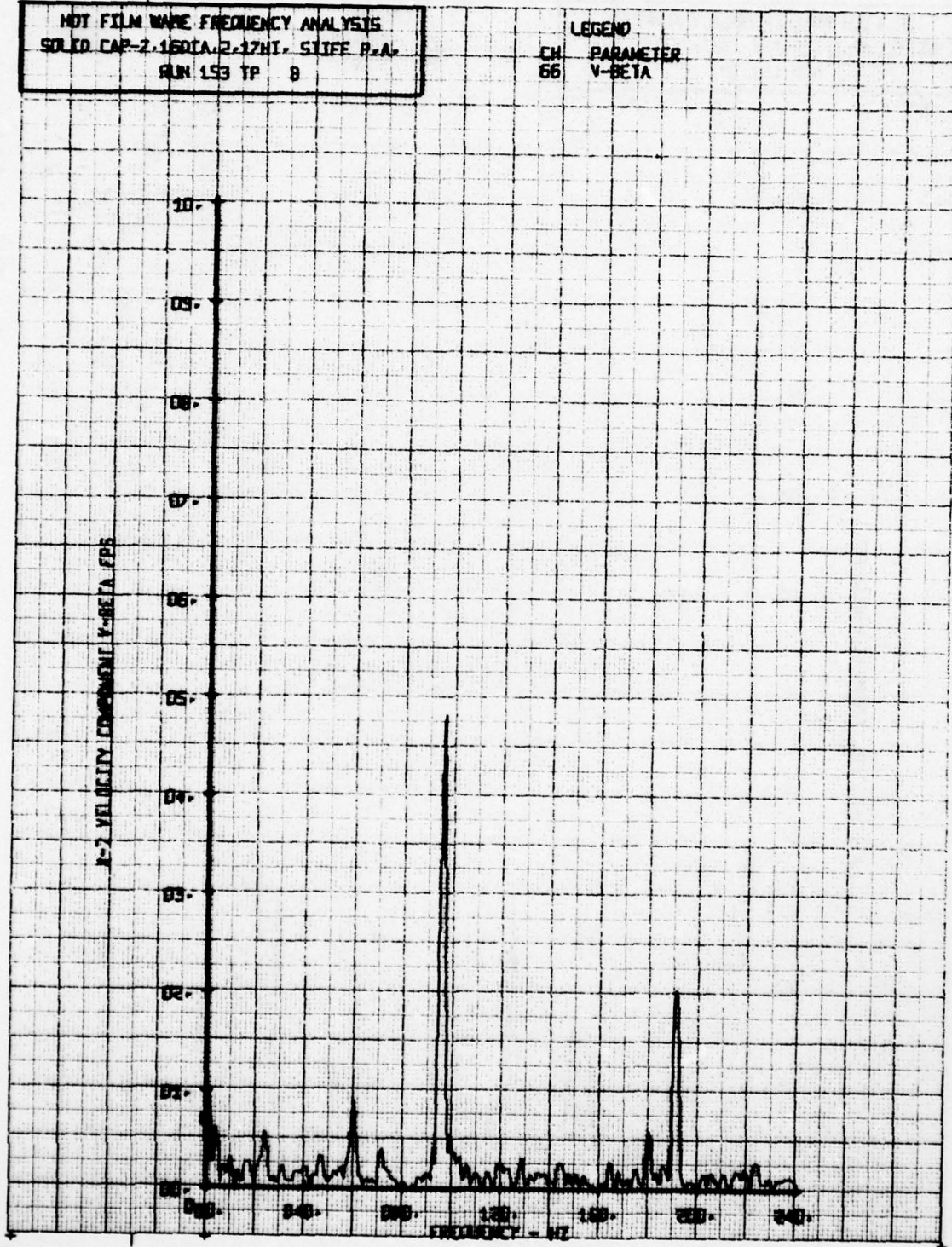
NOT FILM WAVE FREQUENCY ANALYSIS
 S01 TO CAP-7.16DTA-2.12HT. STIFF P.A.
 RUN 153 TP 7

LEGEND
 CH PARAMETER
 00 V-BETA



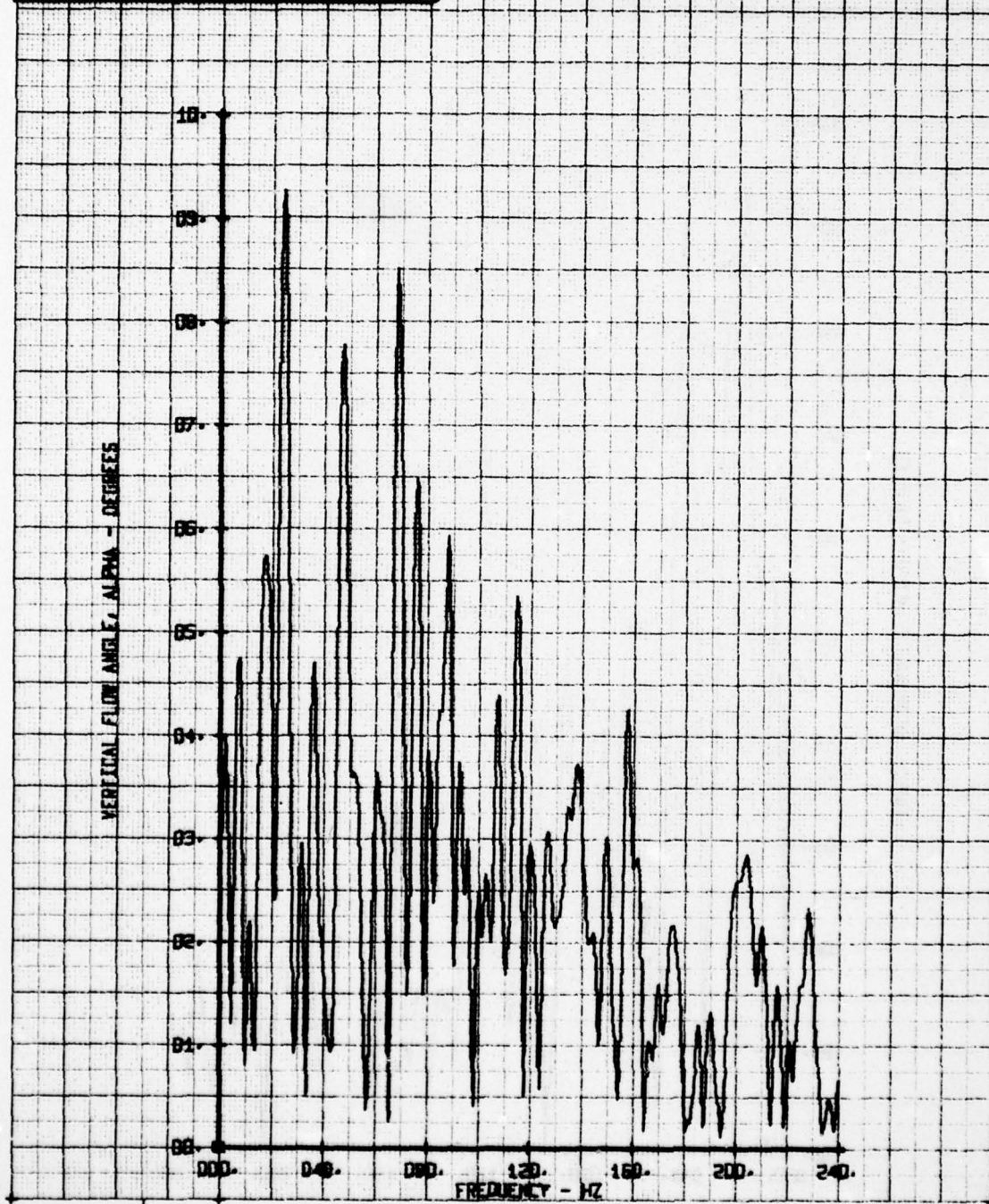
HOT FILM WAVE FREQUENCY ANALYSIS
 SOLID CAP-2.160TA-2.17HI, STIFF P.A.
 RUN 153 TP 8

LEGEND
 CH 66
 PARAMETER
 V-BETA



HOT FILM WAKE FREQUENCY ANALYSIS
50. CAP ON CAN 7.50-2.45H, 8H1-2.11
RUN 207 TP 2

LEGEND
CH PARAMETER
65 ALPHA



AD-A062 640

BOEING VERTOL CO PHILADELPHIA PA
INTERACTIONAL AERODYNAMICS OF THE SINGLE ROTOR HELICOPTER CONF--ETC(U)
SEP 78 P F SHERIDAN

F/6 1/3

DAAJ02-77-C-0020

UNCLASSIFIED

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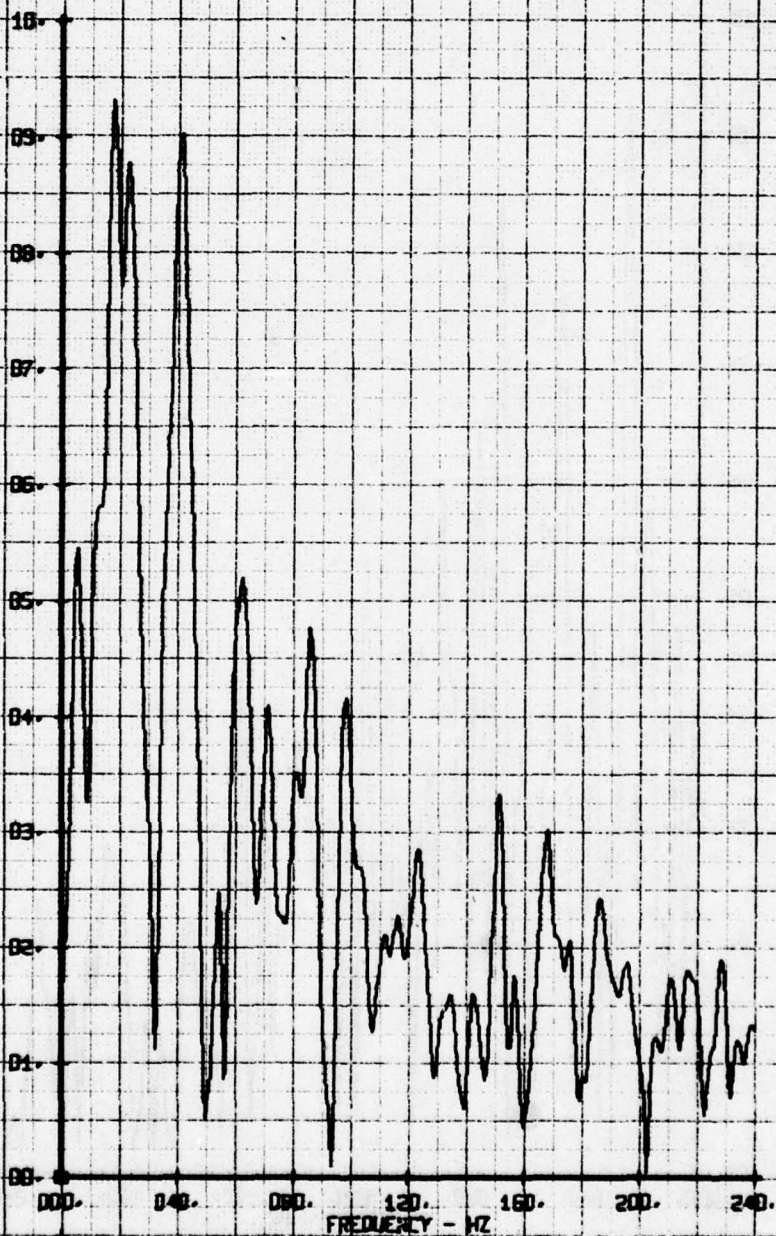
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11



HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ON CAN 7.50, 2.45N, 0.41, 2.41
RUN 207 TP 3

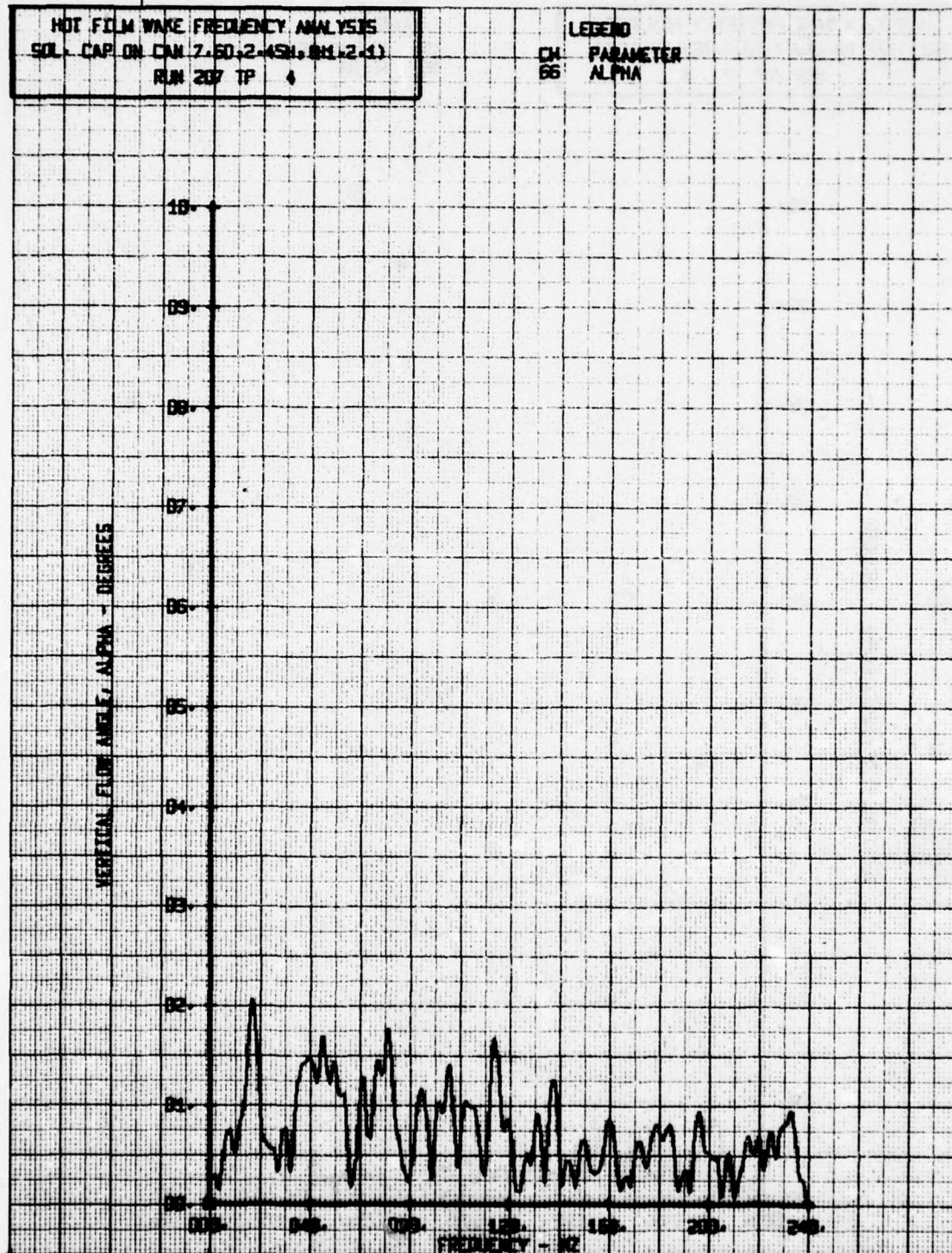
LEGEND
DN
66
PARAMETER
ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



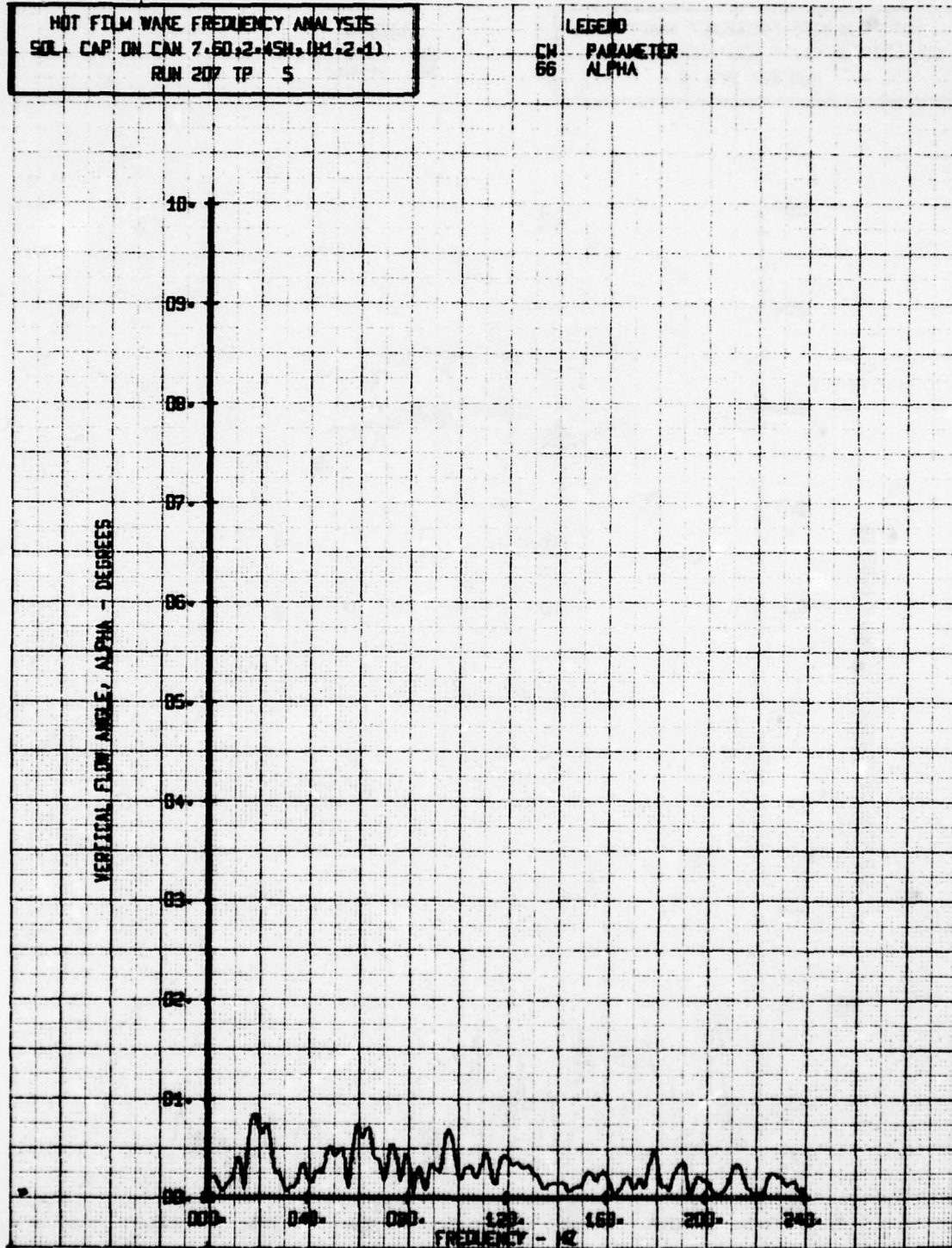
HOT FILM WAKE FREQUENCY ANALYSIS
SOL - CAP ON CAN 7.50, 2.45H, 8H, 2.1)
RUN 207 TP 4

LEGEND
CH: PARAMETER
66: ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ON CAN 7.60, 2.45H, 0.11, 2.41
RUN 207 TP 5

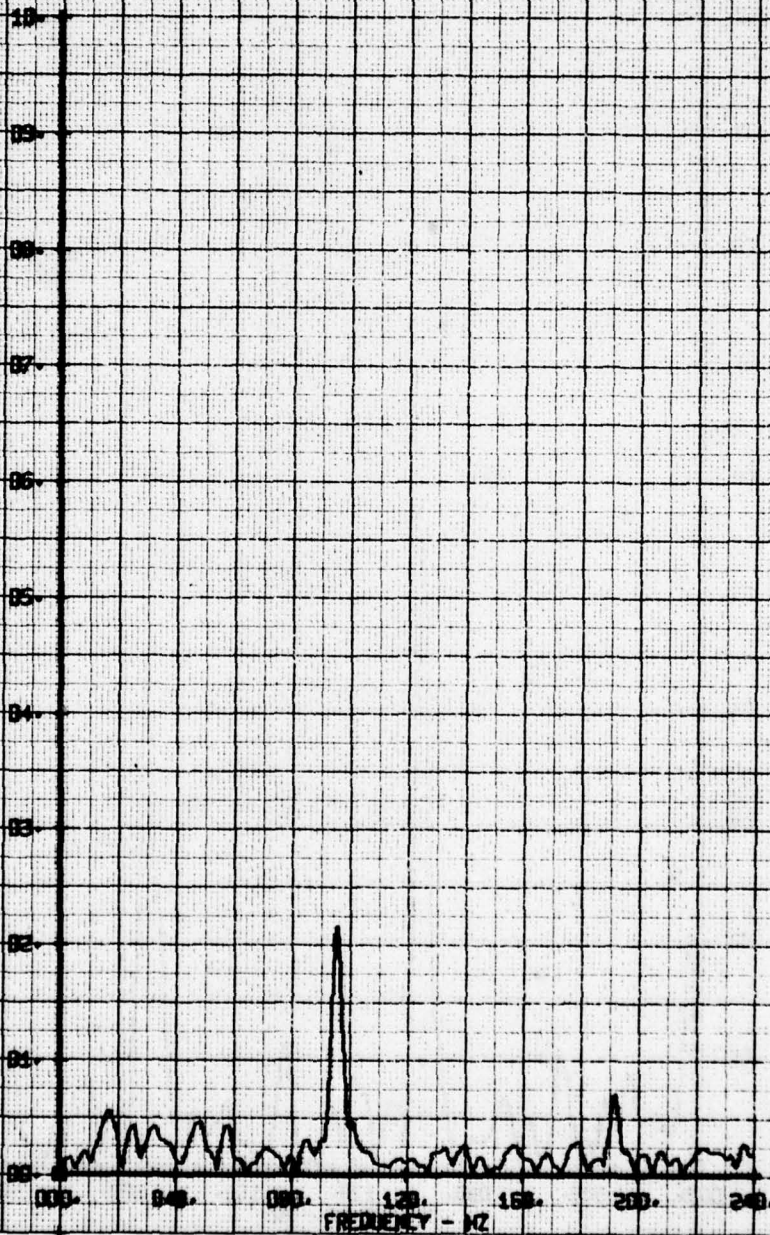
LEGEND
CH 66 PARAMETER
ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
 SN. 001 ON CM 7.50-2-45N. 001-2-41
 RM 207 P 6

LEGEND
 CH PARAMETER
 05 ALPHA

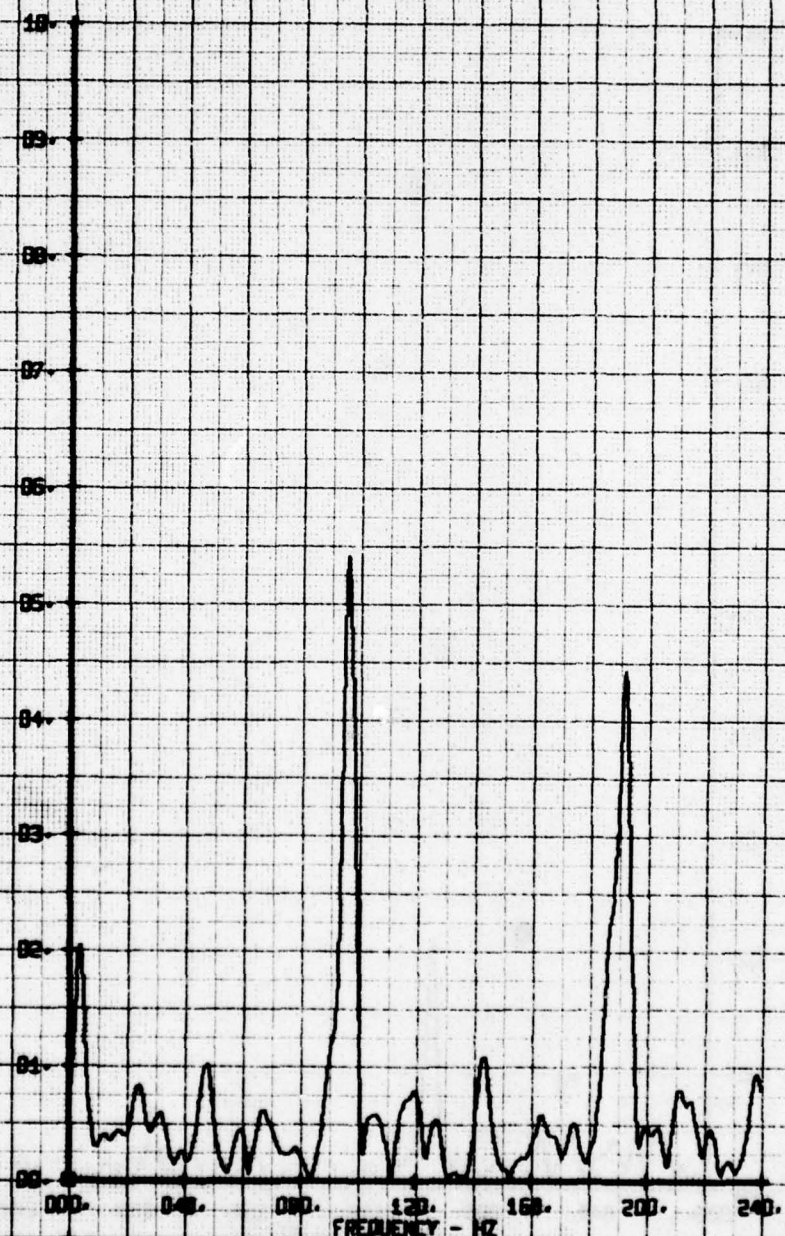
VERTICAL FLUX ANGLE, ALPHA - DEGREES



HOT FILM WIRE FREQUENCY ANALYSIS
SOL. CAP ON CAN 7.50-2.45N. (M-2-4)
RUN 207 TP 7

LEGEND
CH
56
PARAMETER
ALPHA

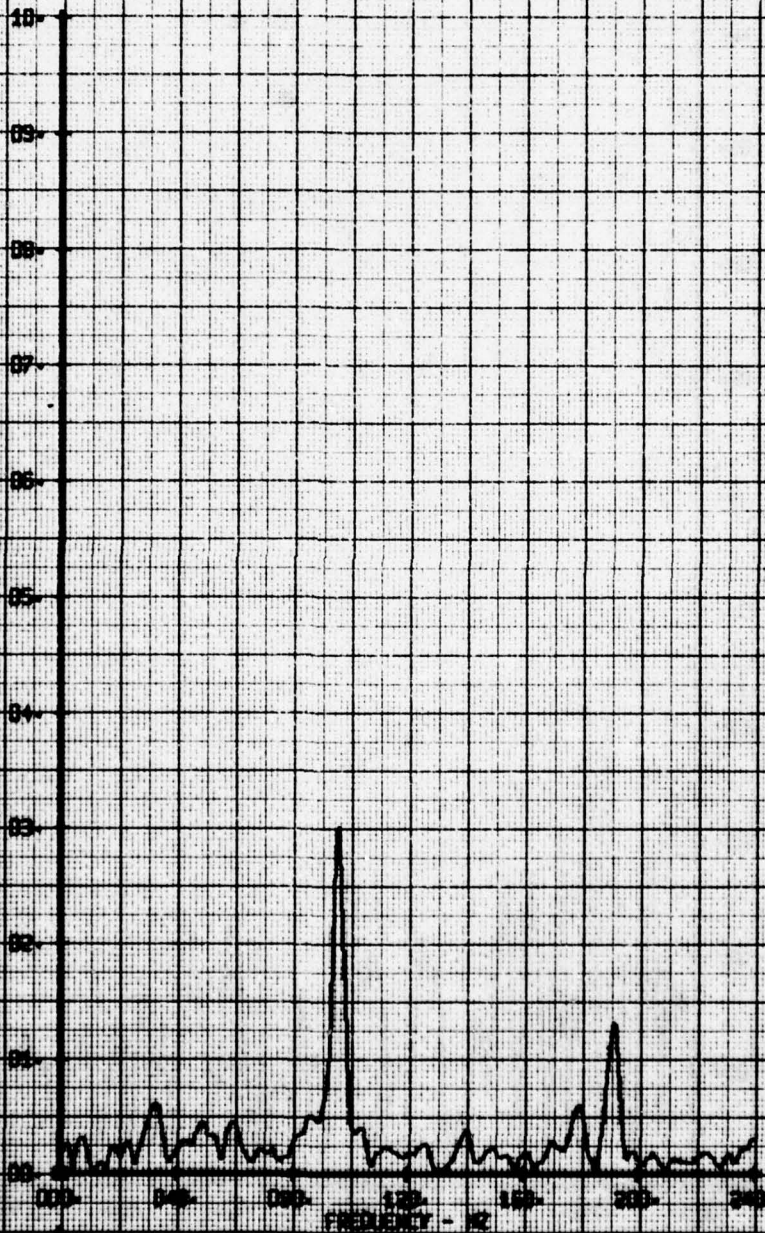
VERTICAL FLOW ANGLE, ALPHA - DEGREES



NOT FILM WAVE FREQUENCY ANALYSIS
SOL. CAP. ON CAN 7.50, 2.45N, 0.11, 2.11
RUN 207 TP 0

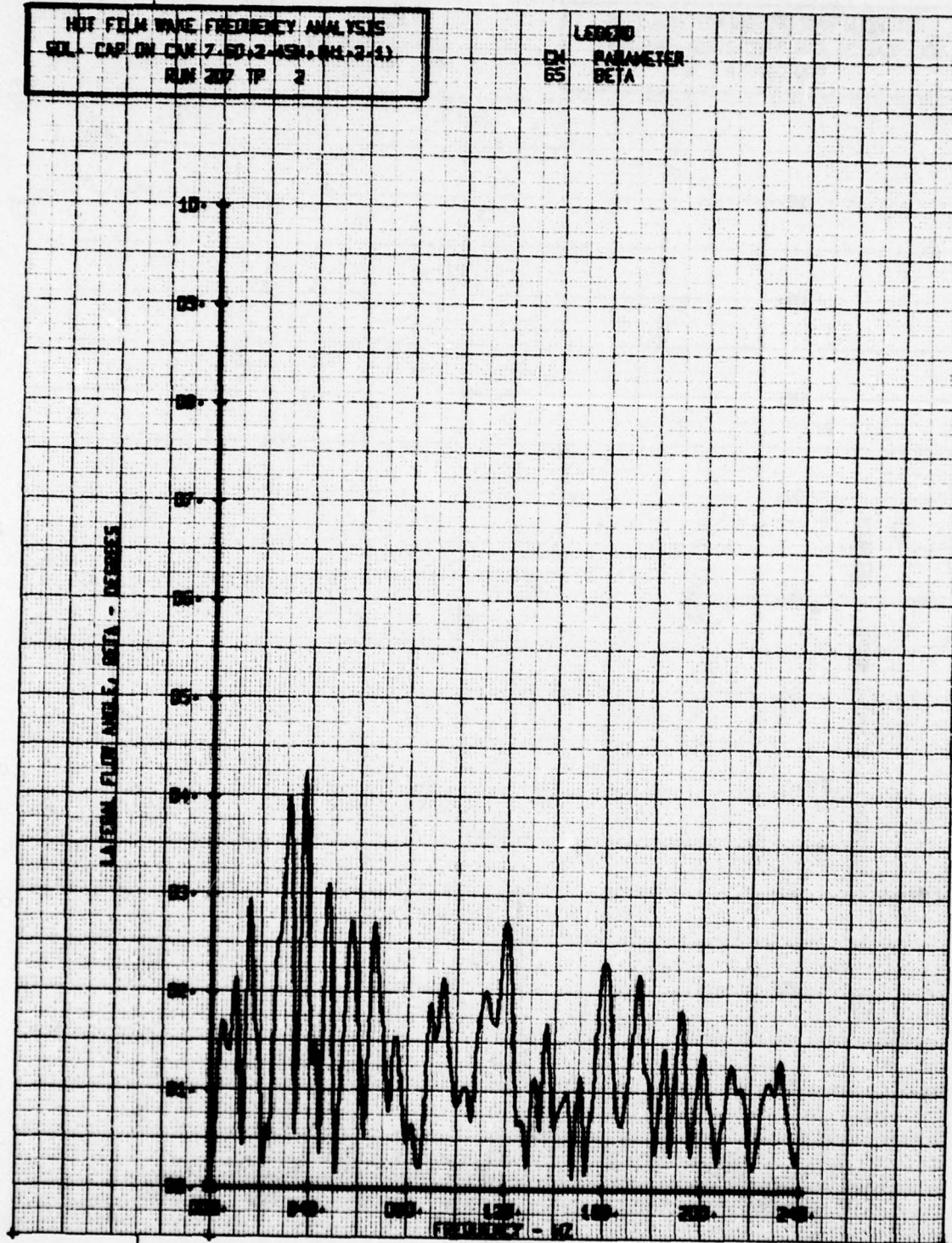
LEGEND
CH 66 PARAMETER
66 ALPHA

VERTICAL FLUX ANGLE, ALPHA - DEGREES



NOT FILM WAVE FREQUENCY ANALYSIS
SOL - CAP ON CAV 7.50-2-45H-041-2-1)
RUN 207 TP 2

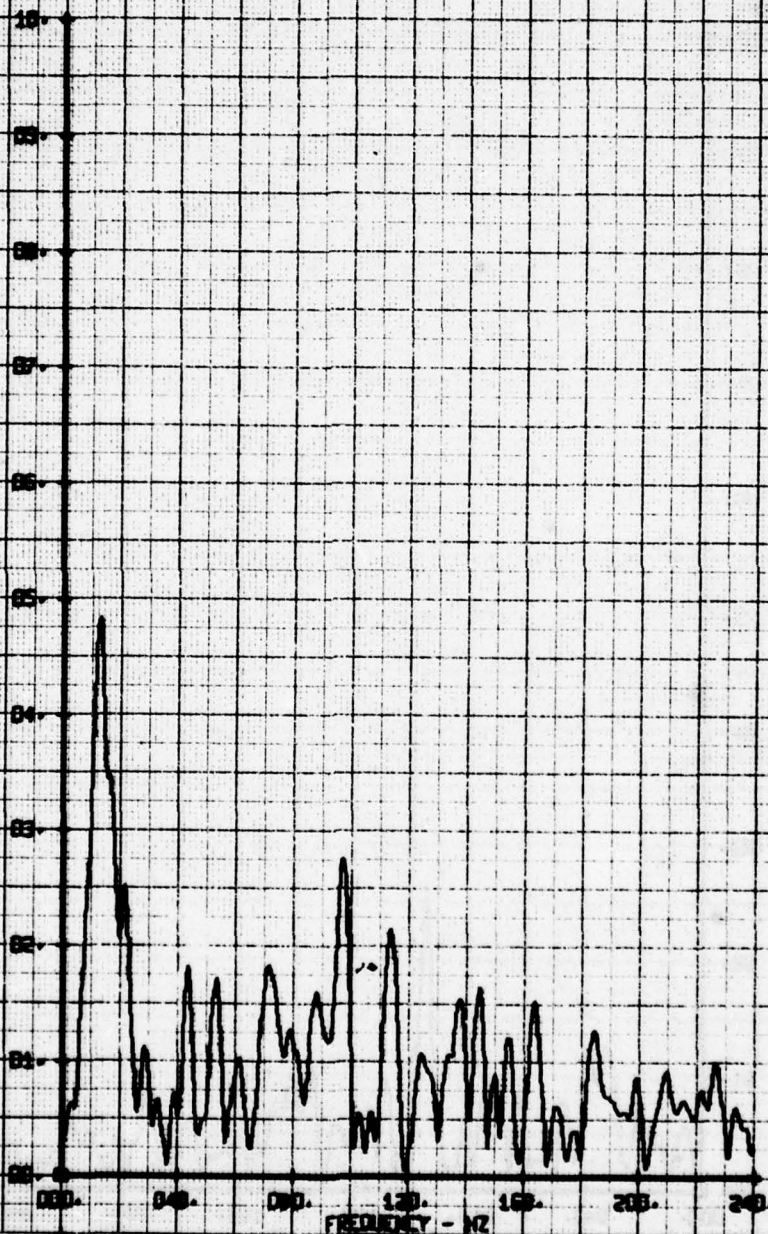
LEGEND
CH PARAMETER
BS BETA



HOT FILM WIRE FREQUENCY ANALYSIS
COL. CAP. ON CAN 7-88-2-45A, 841-2-41
RAN 287 TP 3

LEGEND
CN PARAMETER
BS BETA

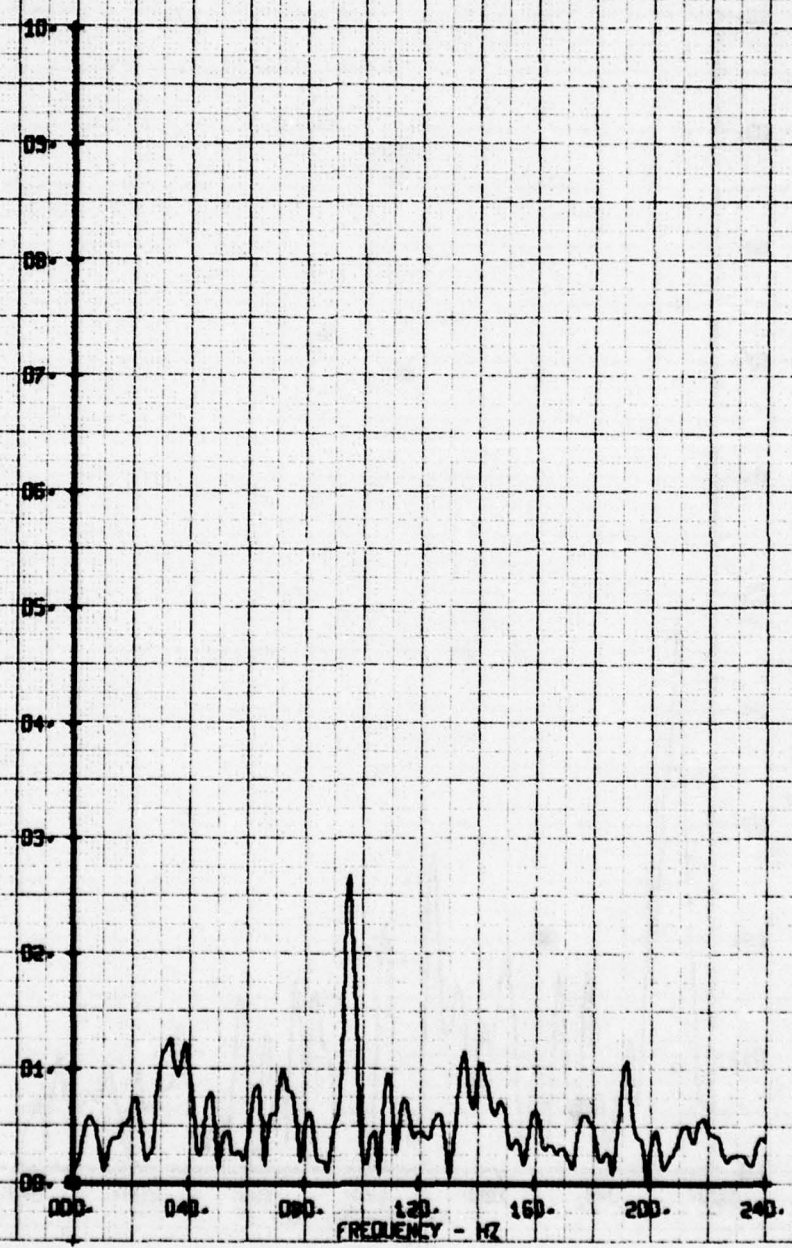
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE FREQUENCY ANALYSIS
SOL CAP ON CAN 7-60-2-ASH. (H. 2-4)
RUN 207 TP 4

LEGEND
CH 65
PARAMETER
BETA

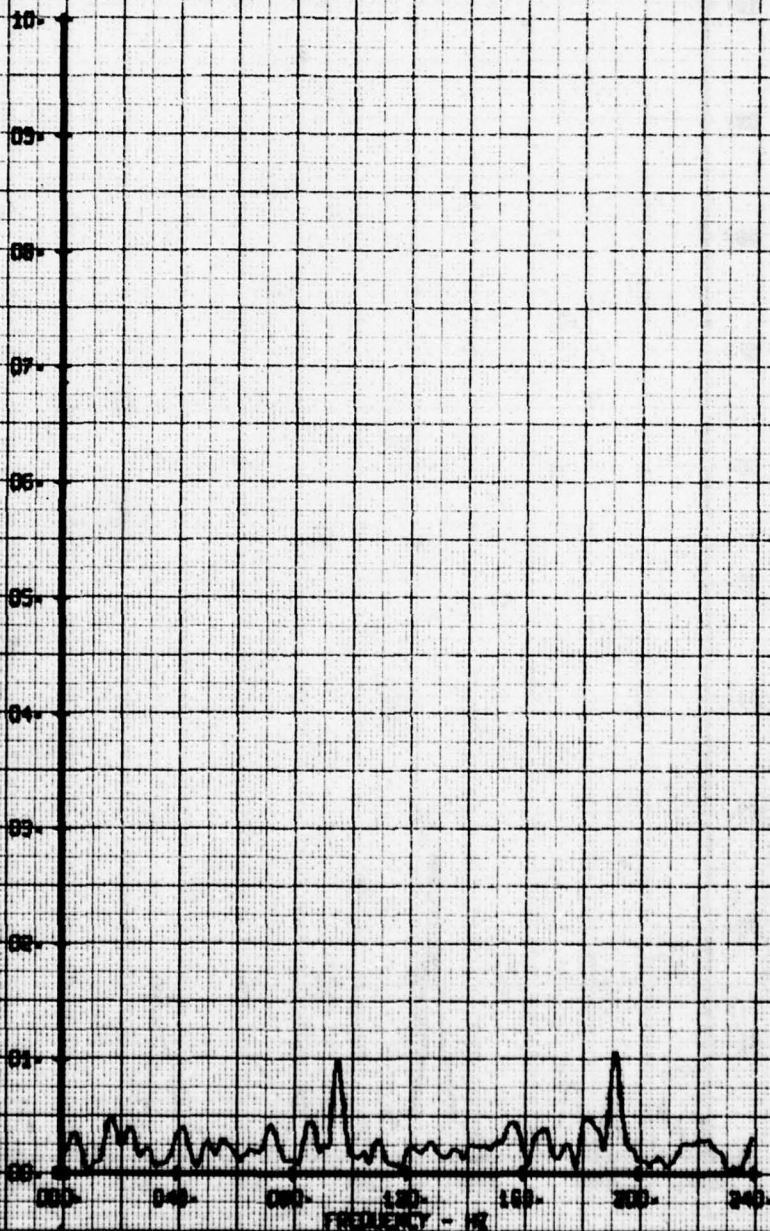
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAVE FREQUENCY ANALYSIS
SOL CAP ON CAN 7-80-2-15N (M1-2-1)
RUN 207 TP 5

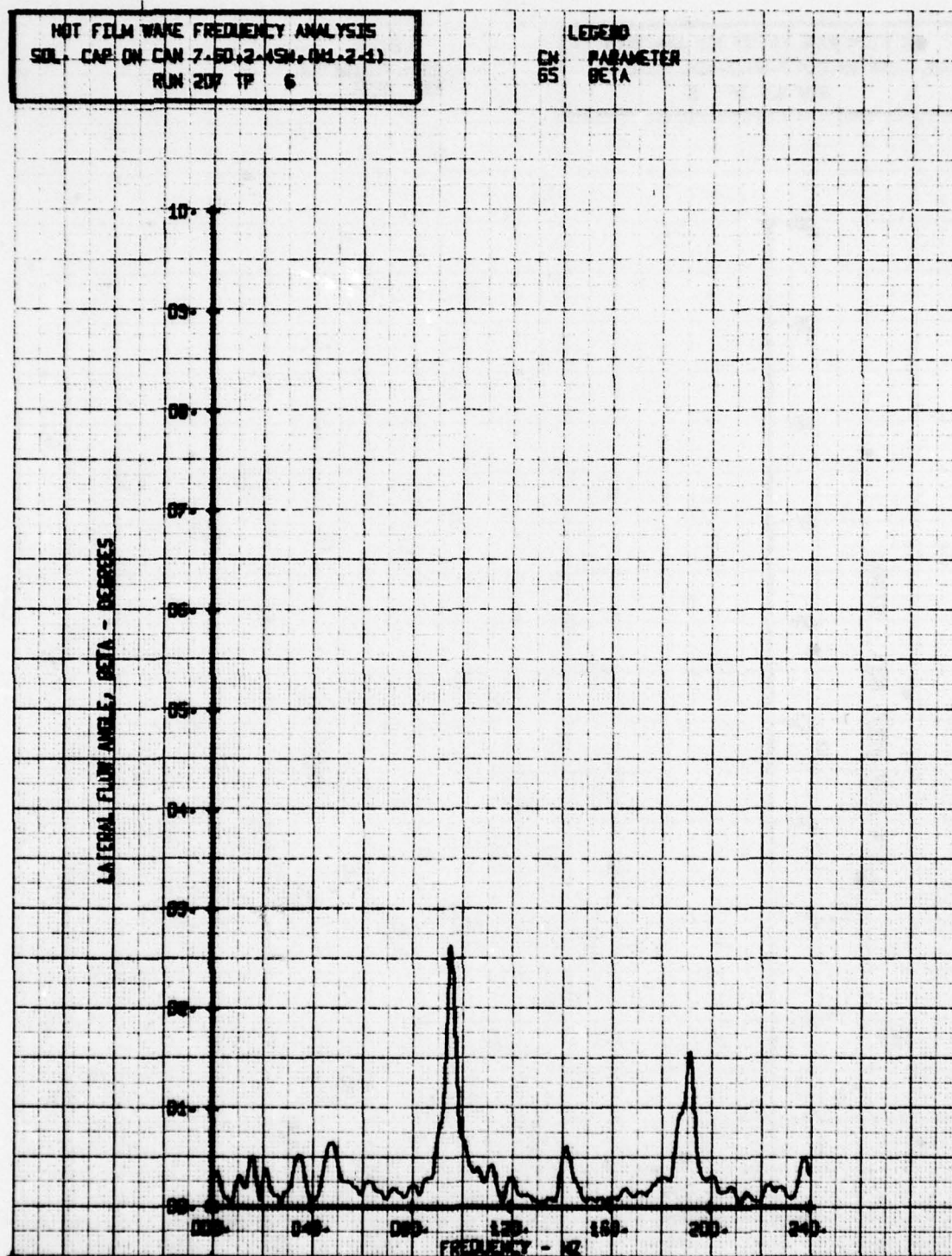
LEGEND
CH PARAMETER
65 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



NOT FILM WARE FREQUENCY ANALYSIS
SOL. CAP ON CAN 7-60-2-4SM-0M1-2-1)
RUN 207 TP 6

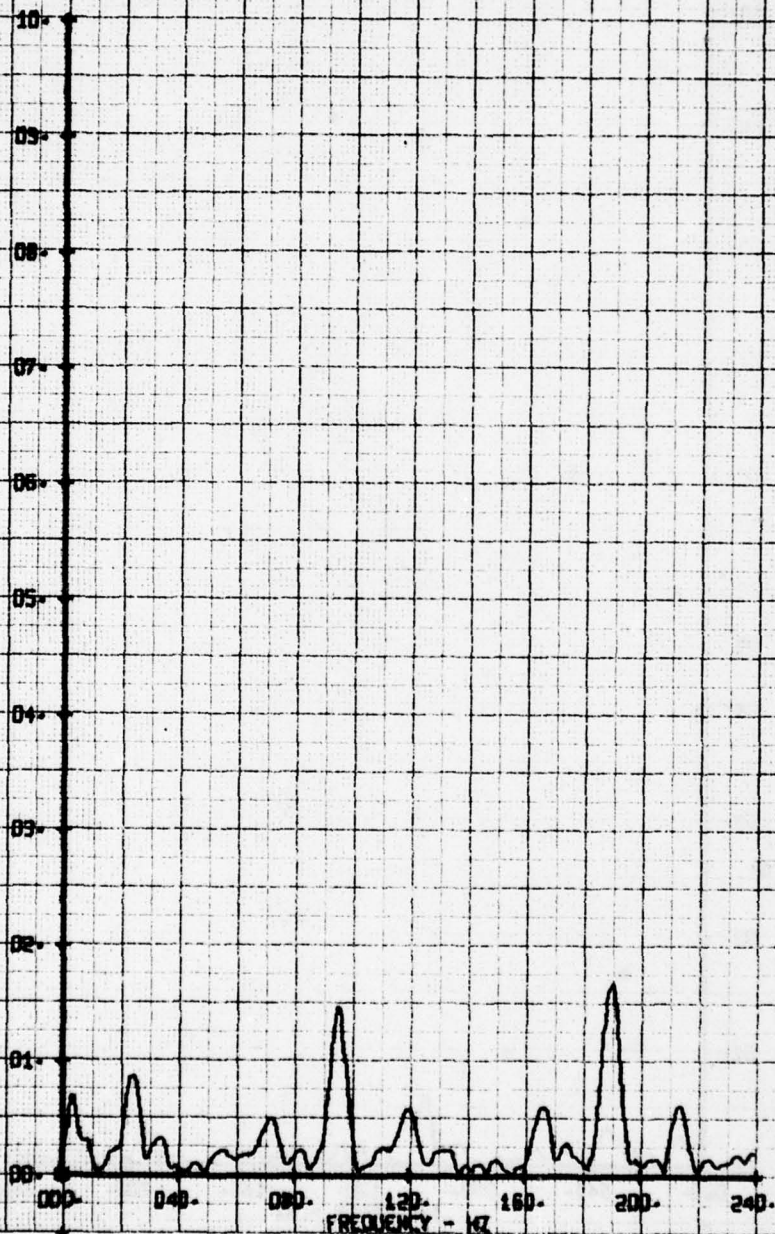
LEGEND
CN 65
PARAMETER
BETA



NOT FILM WARE FREQUENCY ANALYSIS
SOL CAP ON CAN 7-80-2-15M-DNL-2-1)
RUN 207 TP 7

LEGEND
CH 09 PARAMETER
09 BETA

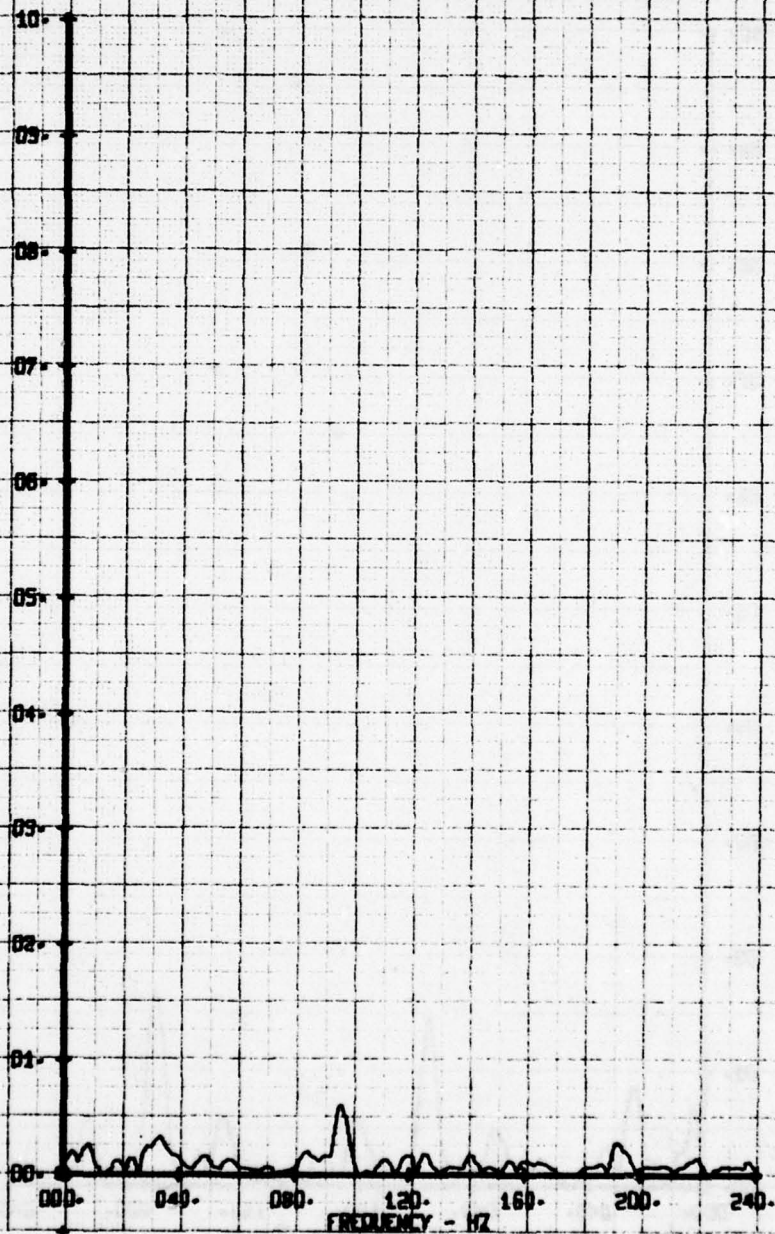
LATERAL FLOW ANGLE, BETA - DEGREES



NOT FILM WIRE FREQUENCY ANALYSIS
CBL CAP-ON CAN 7-20-3-ASH (M-3-4)
RUN 207 TP 8

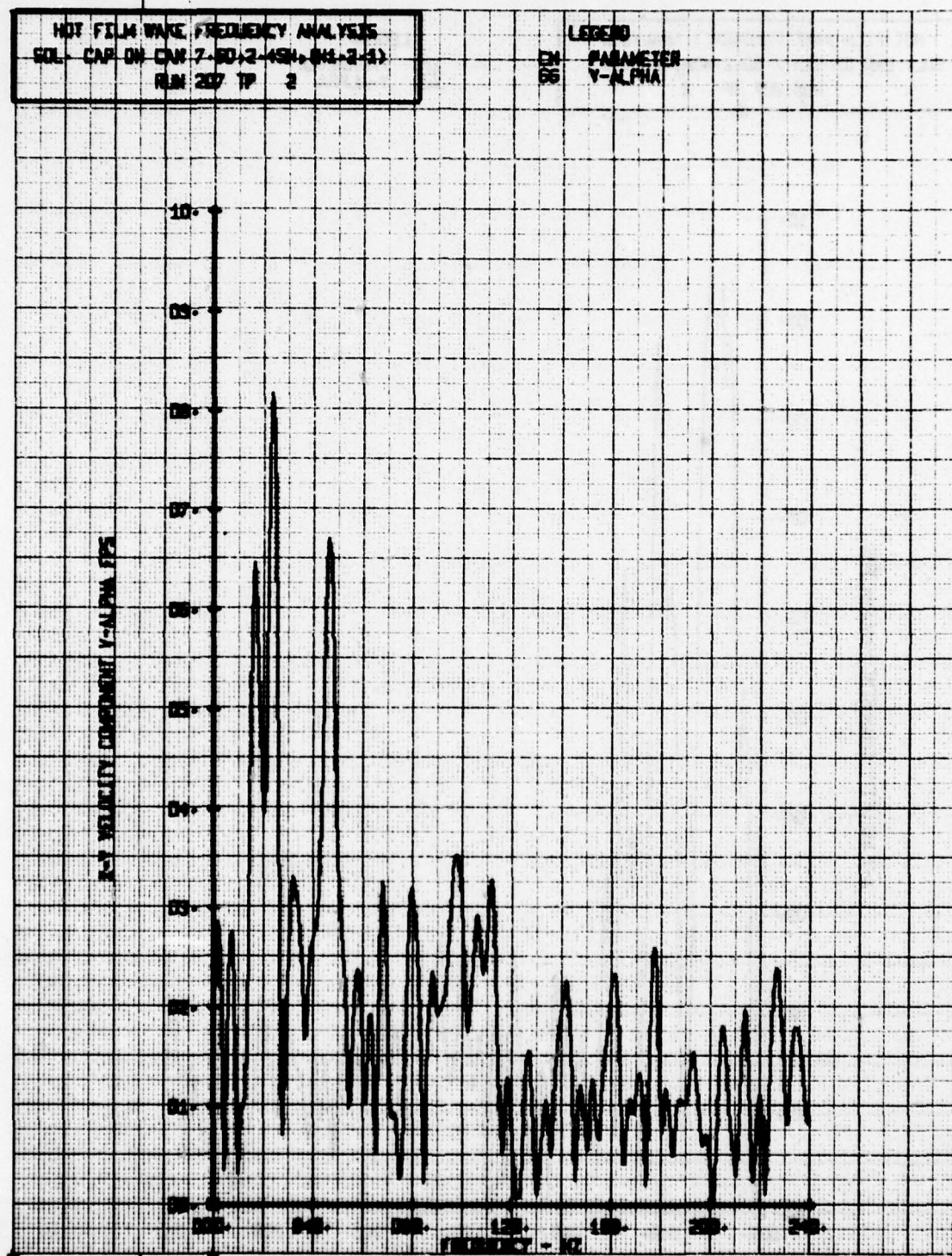
LEGEND
CH PARAMETER
65 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



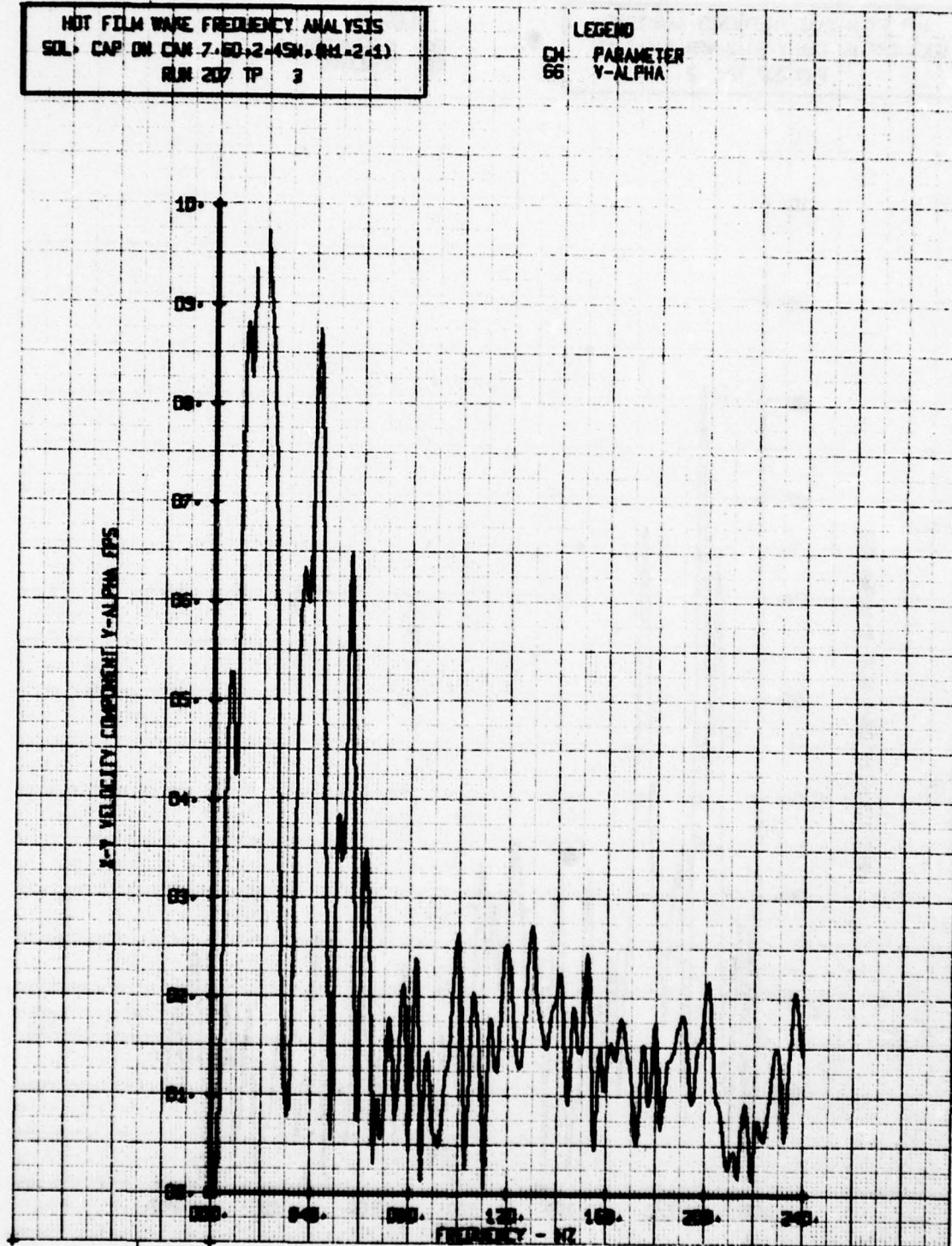
HOT FILM WAKE FREQUENCY ANALYSIS
SOL CAP ON CAV 7-50+2-45N+5N1-2-1)
RUN 207 TP 2

LEGEND
CH PARAMETER
66 Y-ALPHA



HOT FILM WIRE FREQUENCY ANALYSIS
SOL. CAP ON CAN 7-60-2-45N. (M-2-1)
RUN 207 TP 3

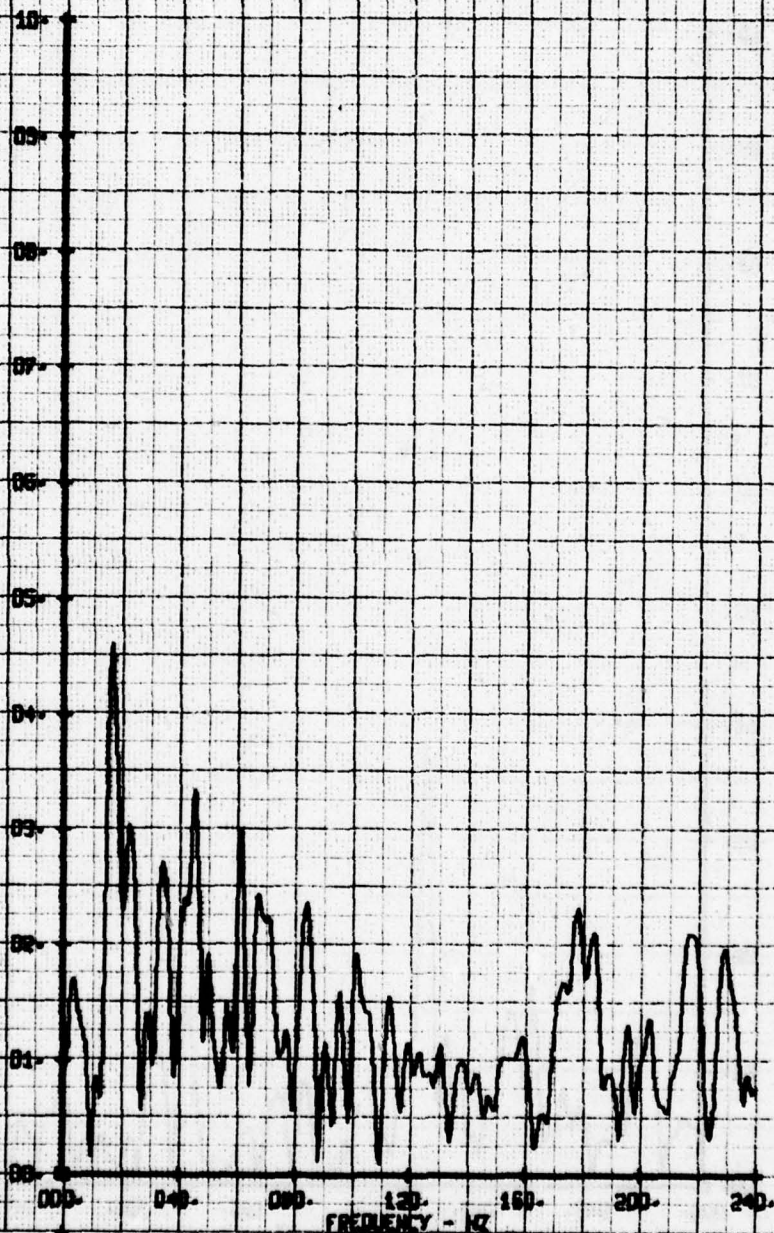
LEGEND
CH. PARAMETER
66 V-ALPHA



HIT FILM WARE FREQUENCY ANALYSIS
SEL. CAP. ON CAN 7-80-2-45M-021-2-21
RUN 207 TP 4

LEADER
CH 56
PARAMETER
V-ALPHA

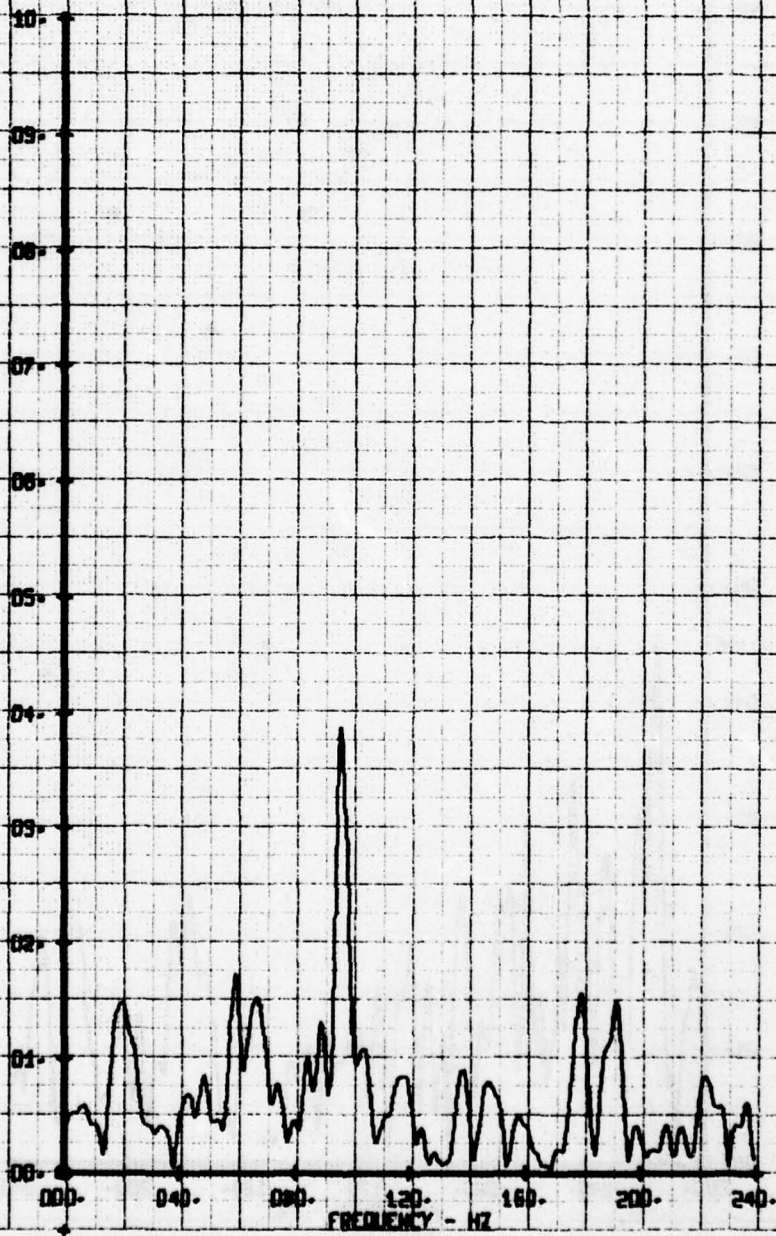
X-Y VELOCITY COMPONENT V-ALPHA FPS



NOT FILM WIRE FREQUENCY ANALYSIS
SOL CAP ON CAN 7-60-2-15N (M-2-1)
RUN 207 TP 5

LEGEND
CH PARAMETER
56 V-ALPHA

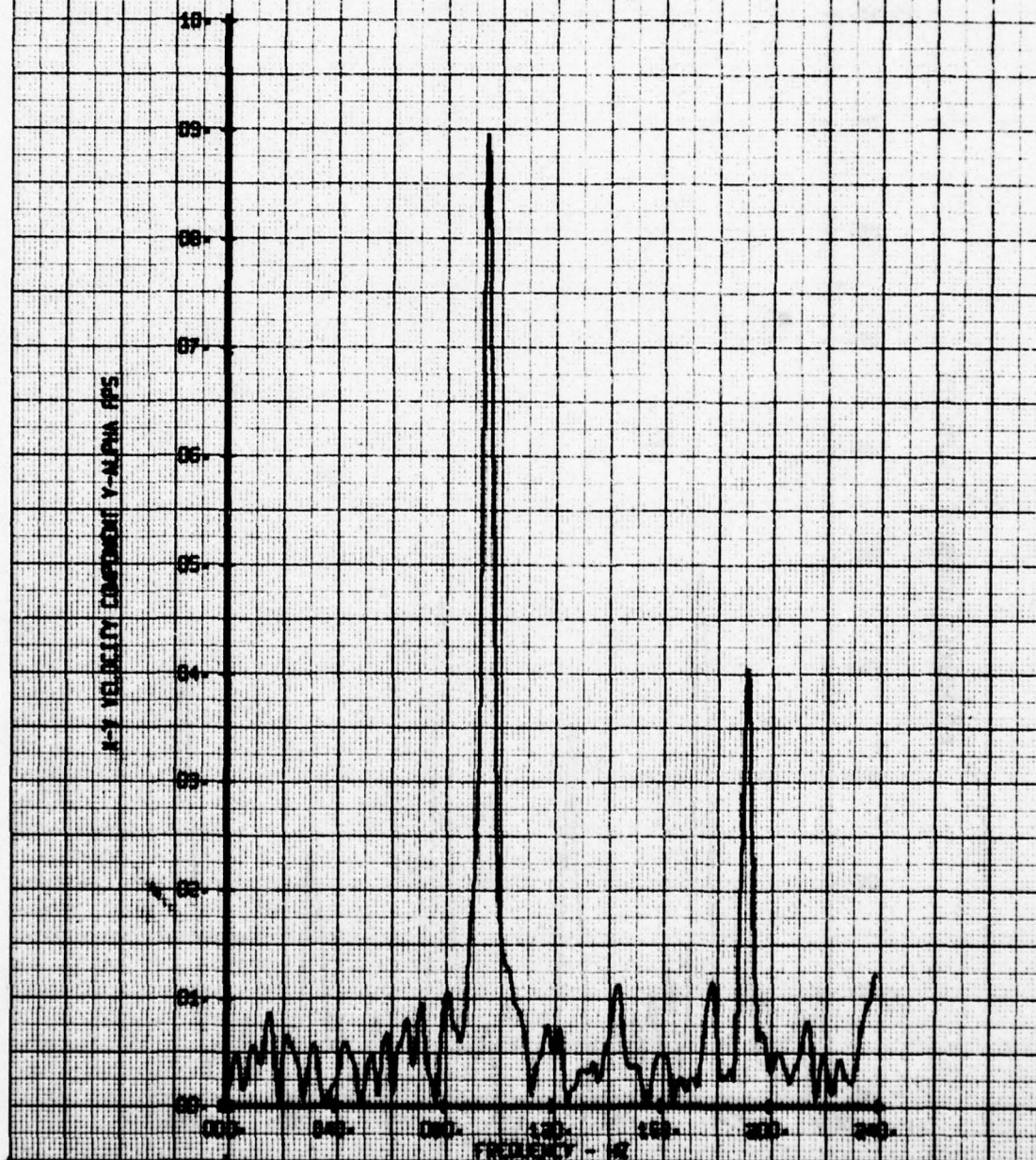
X-Y VELOCITY COMPONENT V-ALPHA FPS



NOT FILM WIRE FREQUENCY ANALYSIS
SEL CAP ON CAN 7-60, 2-ASH, (M, 2-3)
RUN 207 TP 6

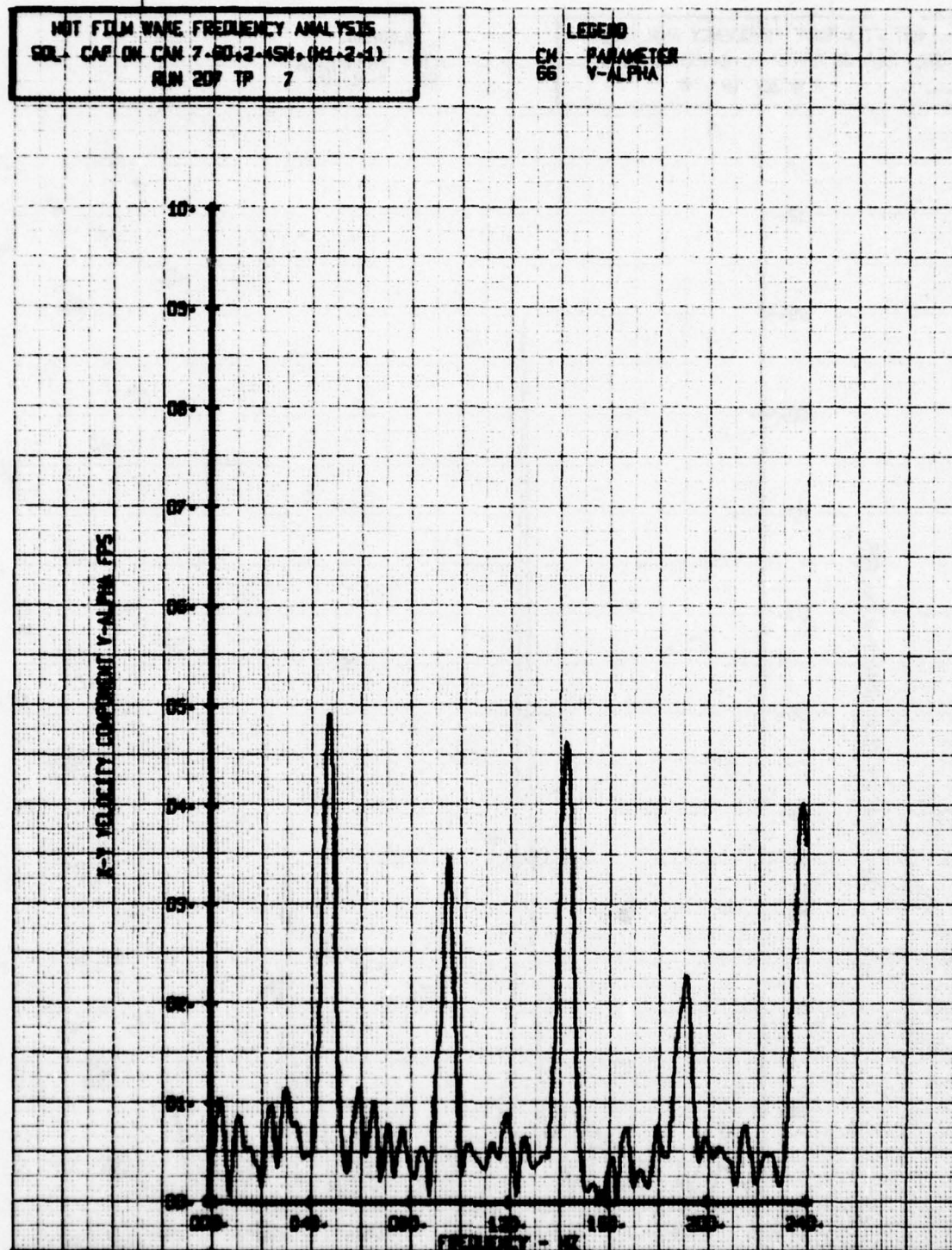
LEGEND
CH 66
PARAMETER
V-ALPHA

V-ALPHA VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAVE FREQUENCY ANALYSIS
SOL. CAP. ON CAN 7-20-2-45H.041-2-11
RUN 207 TP 7

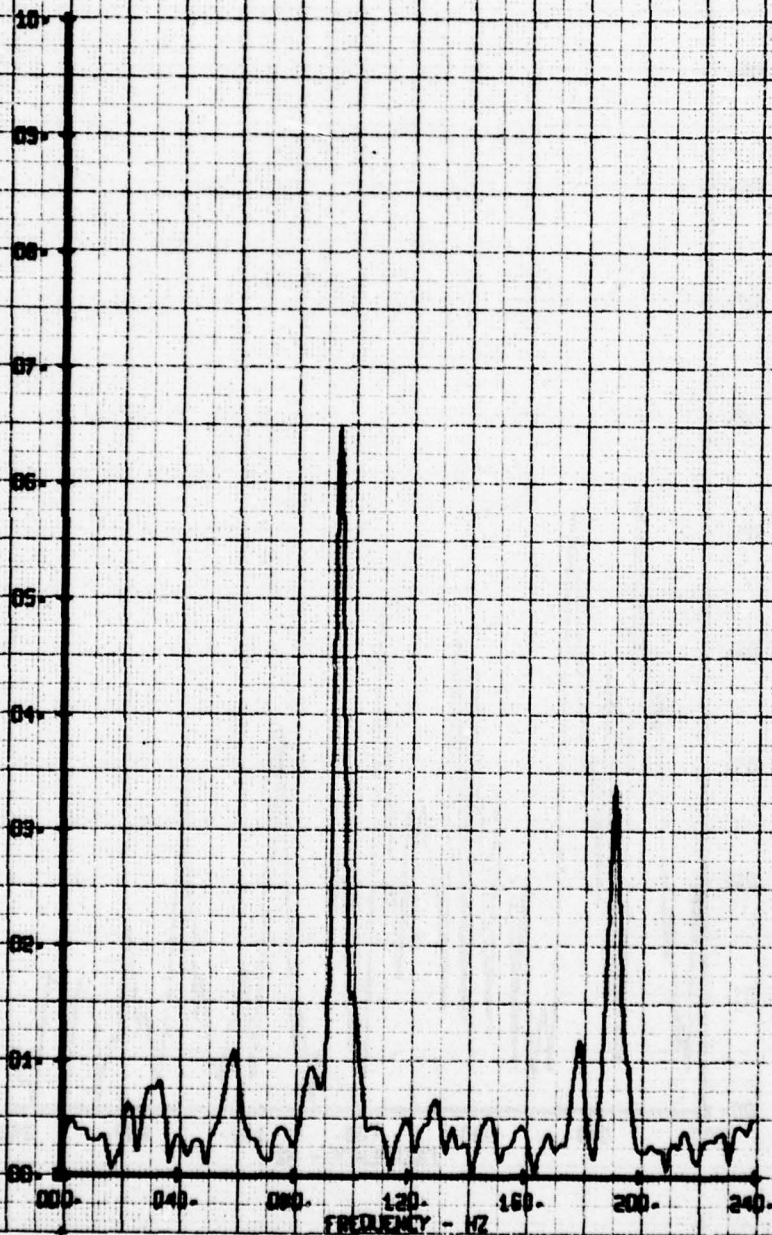
LEGEND
CH 66 - PARAMETER
Y-ALPHA



NOT FILM WAVE FREQUENCY ANALYSIS
50. CAP 60 CAN 7-80-2-15H. (M-2-1)
REN 207 1P 8

LEDDO
CH 66 PARAMETER
66 V-ALPHA

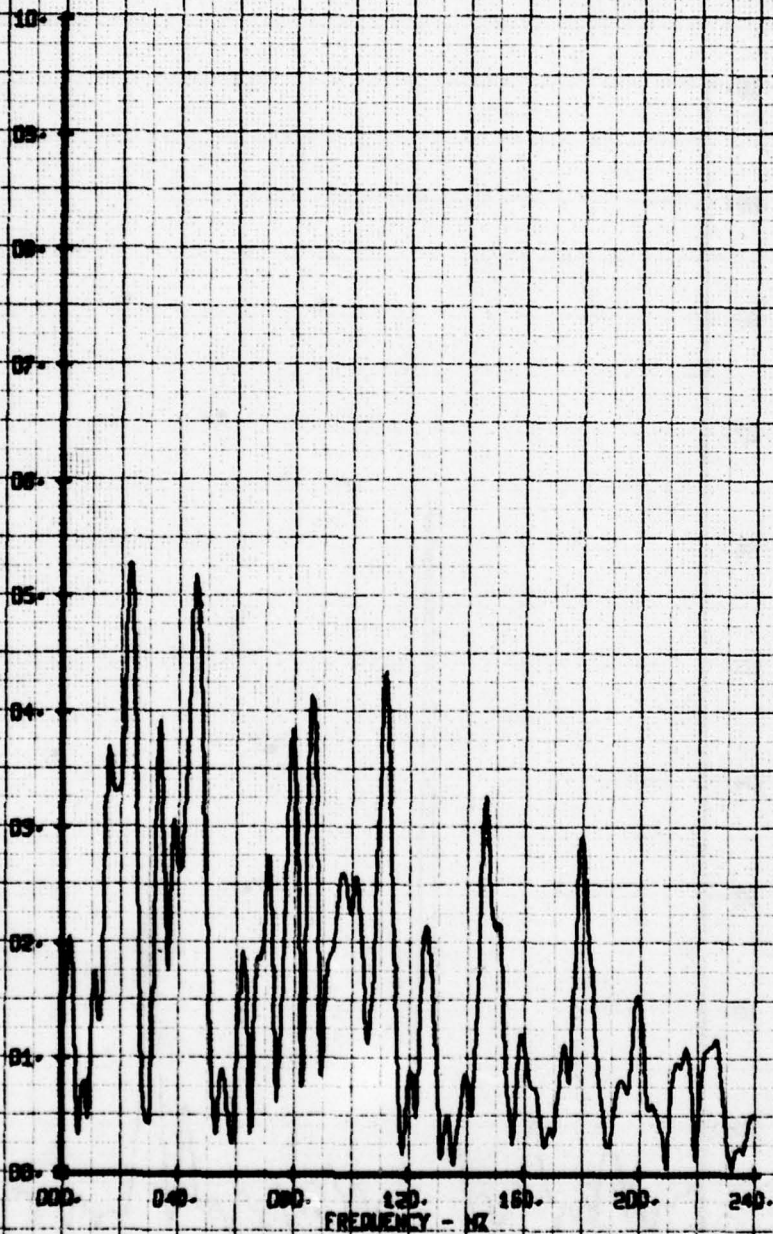
X-Y VELOCITY COMPONENT V-ALPHA FPS



MIF FILM WAVE FREQUENCY ANALYSIS
 SOL CAP ON CAN 7-80-2-45K-04-2-1)
 RUN 207 TP 2

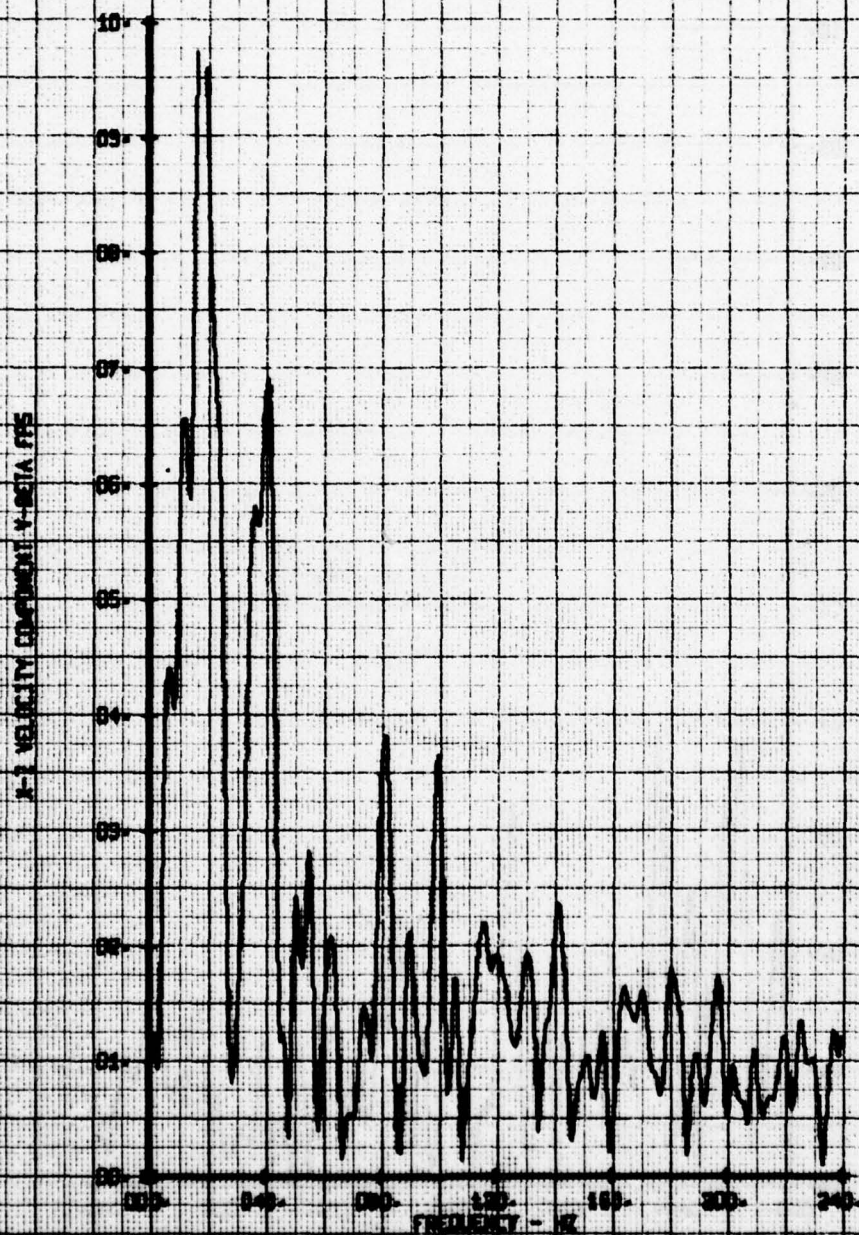
LOGS
 PARAMETER
 V-BETA

X-1 VELOCITY COMPONENT V-BETA FFS



HOT FILM WAVE FREQUENCY ANALYSIS
SOL CAP ON CAN 7.50+2.4SH.(M2.2-1)
RUN 207 TP 3

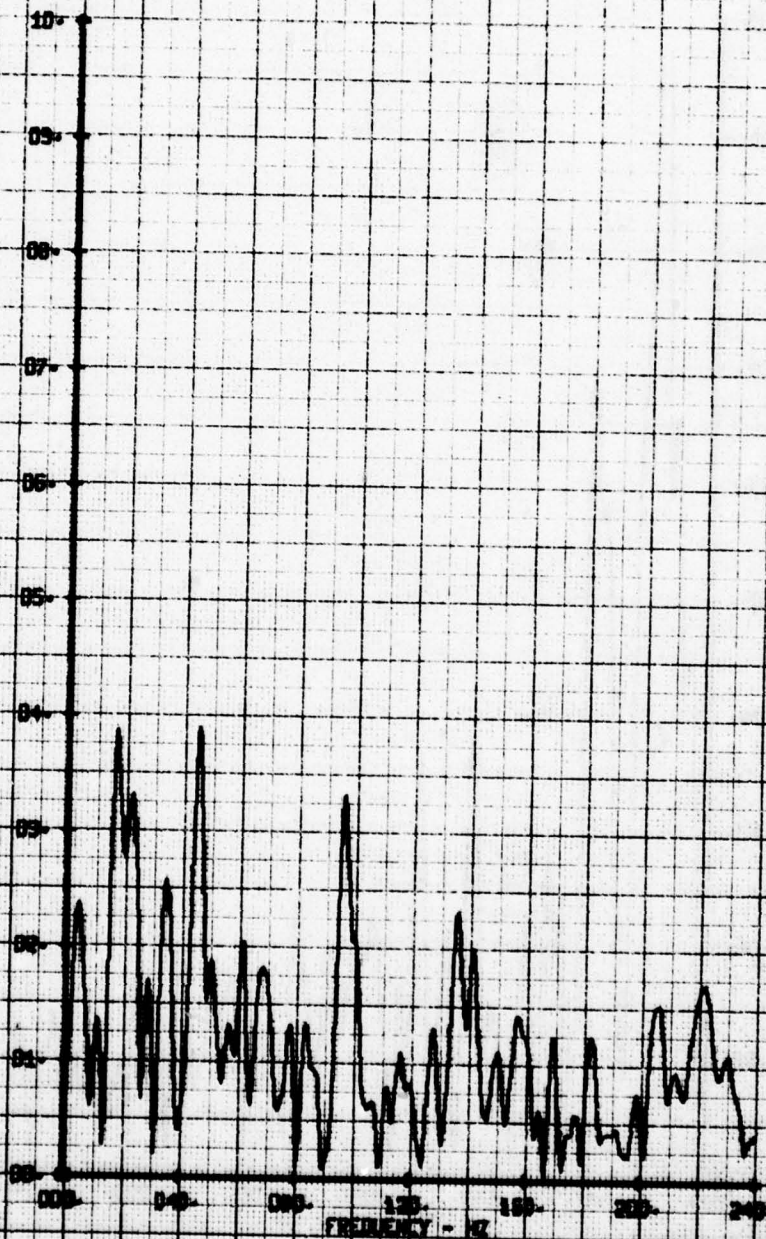
LEGEND
CH 65
PARAMETER
V-BETA

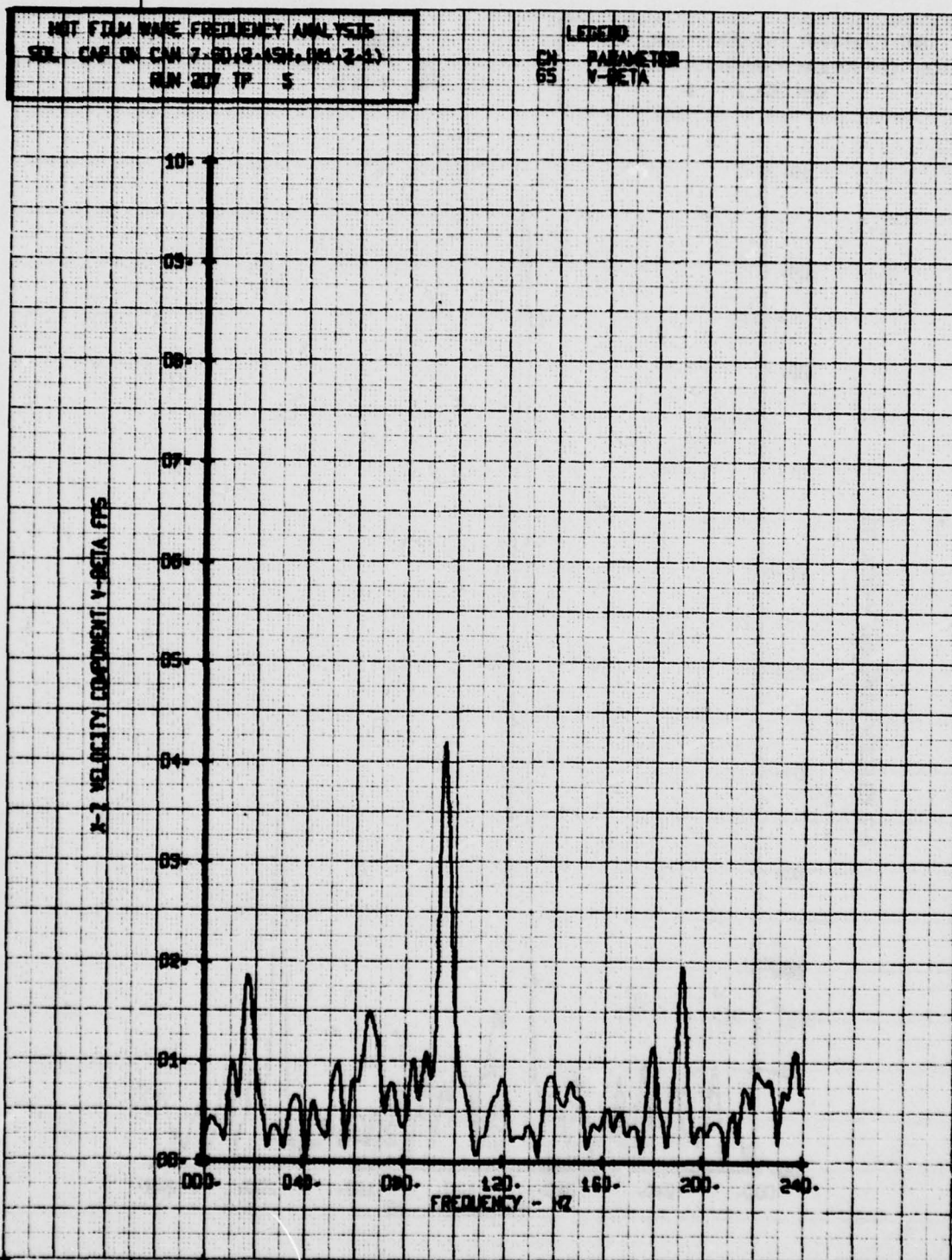


NOT FILM WAVE FREQUENCY ANALYSIS
SOL - CAP ON CAN 7-50-2-ASH-041-2-1)
RUN 207 TP 4

LEGEND
CH PARAMETER
65 V-BETA

V-1 VELOCITY COMPONENT V-BETA FPS

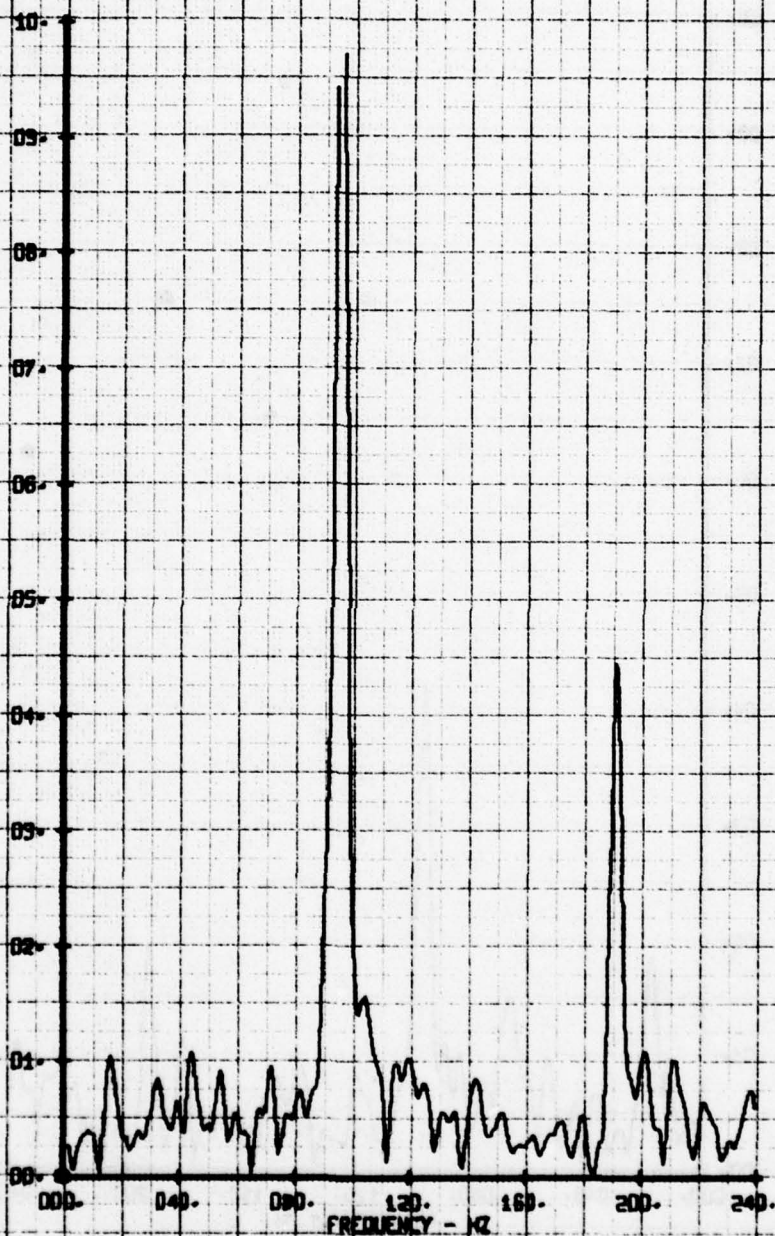




MIT FILM WAVE FREQUENCY ANALYSIS
 SOL CAP ON CAN 7-20.8-ASH (M 3-1)
 RUN 207 TP 6

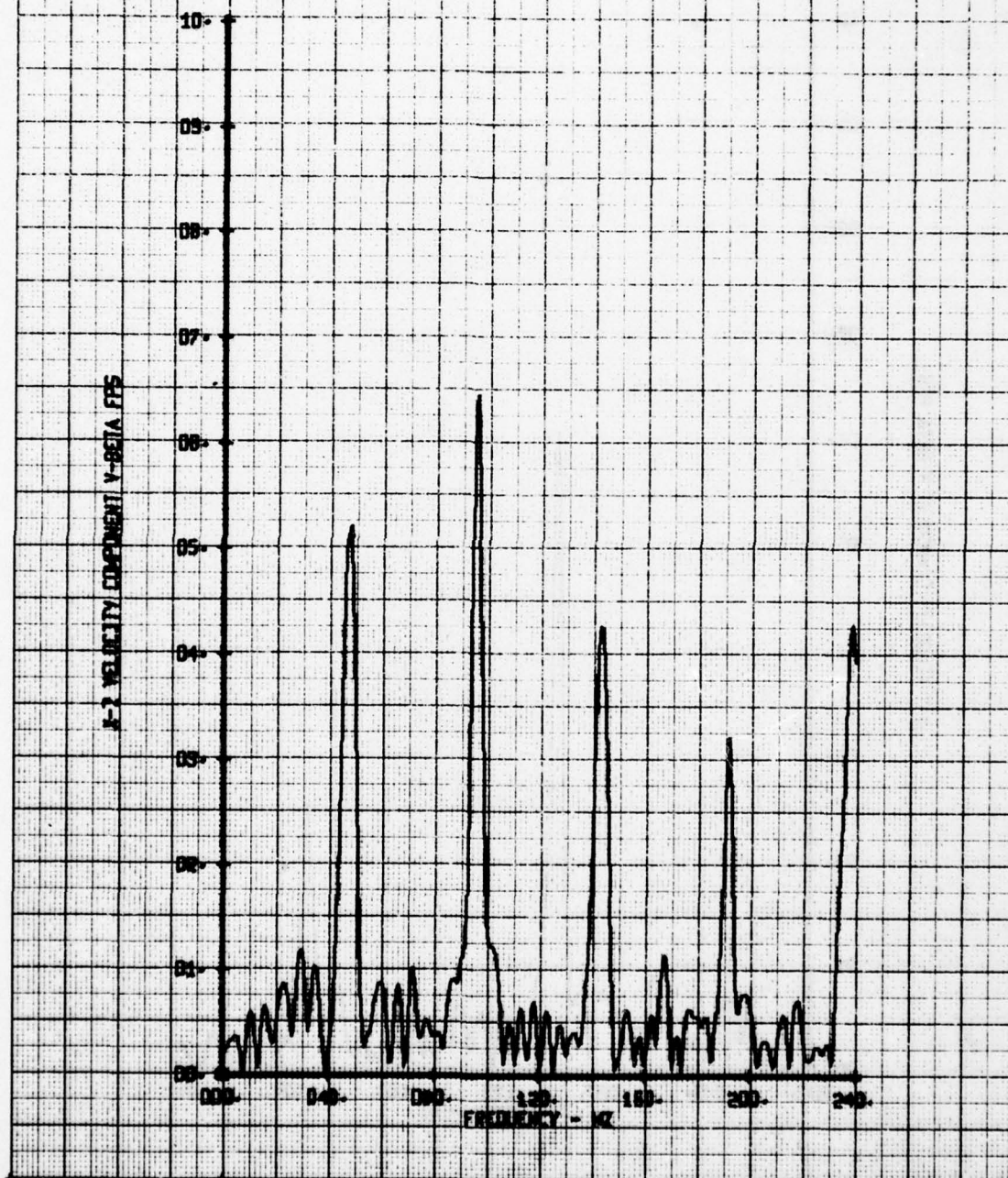
LEGEND
 CH 65
 PARAMETER
 Y-BETA

X-2 VELOCITY COMPONENT Y-BETA FPS



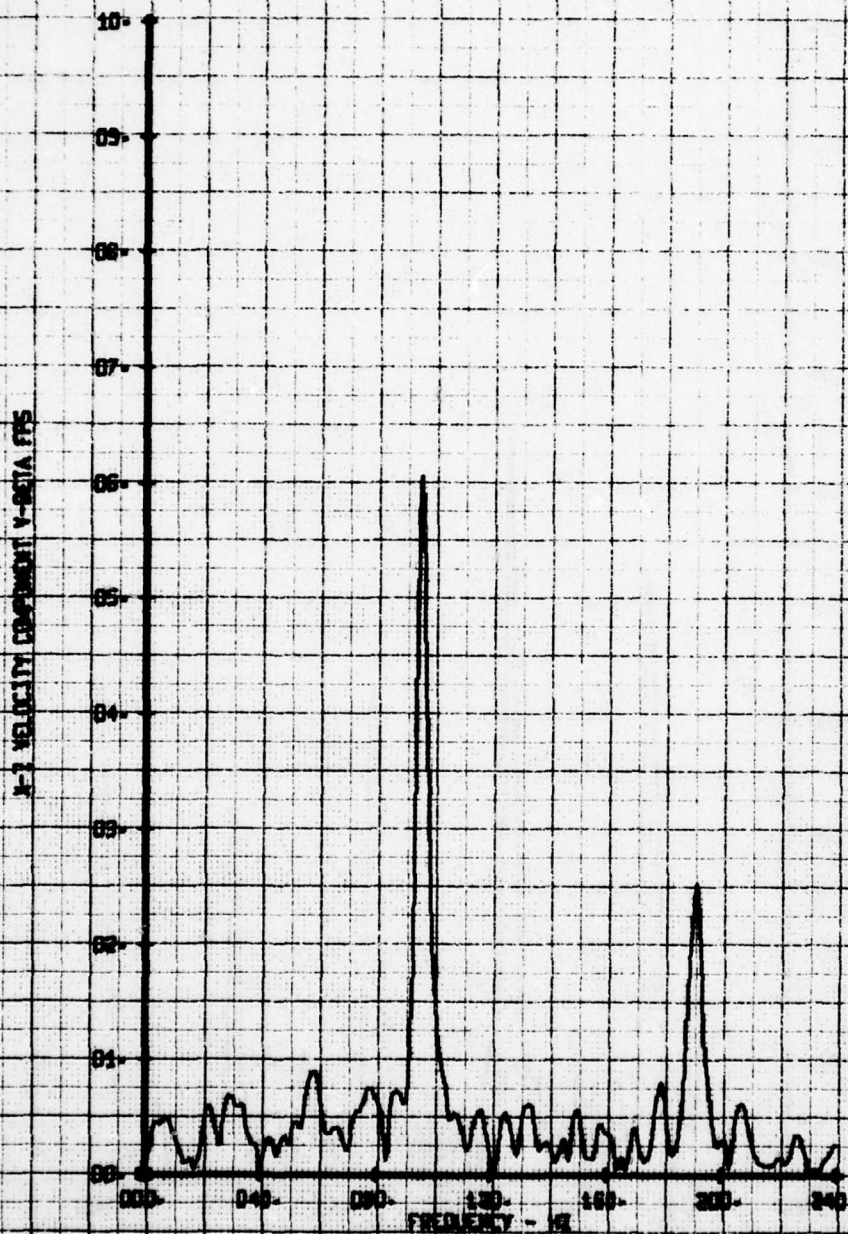
HOT FILM WAKE FREQUENCY ANALYSIS
SOL CAP ON CAN 7-50-2-45N, (M1-2-1)
RUN 207 TP 7

LEGEND
CH 65 PARAMETER
V-BETA



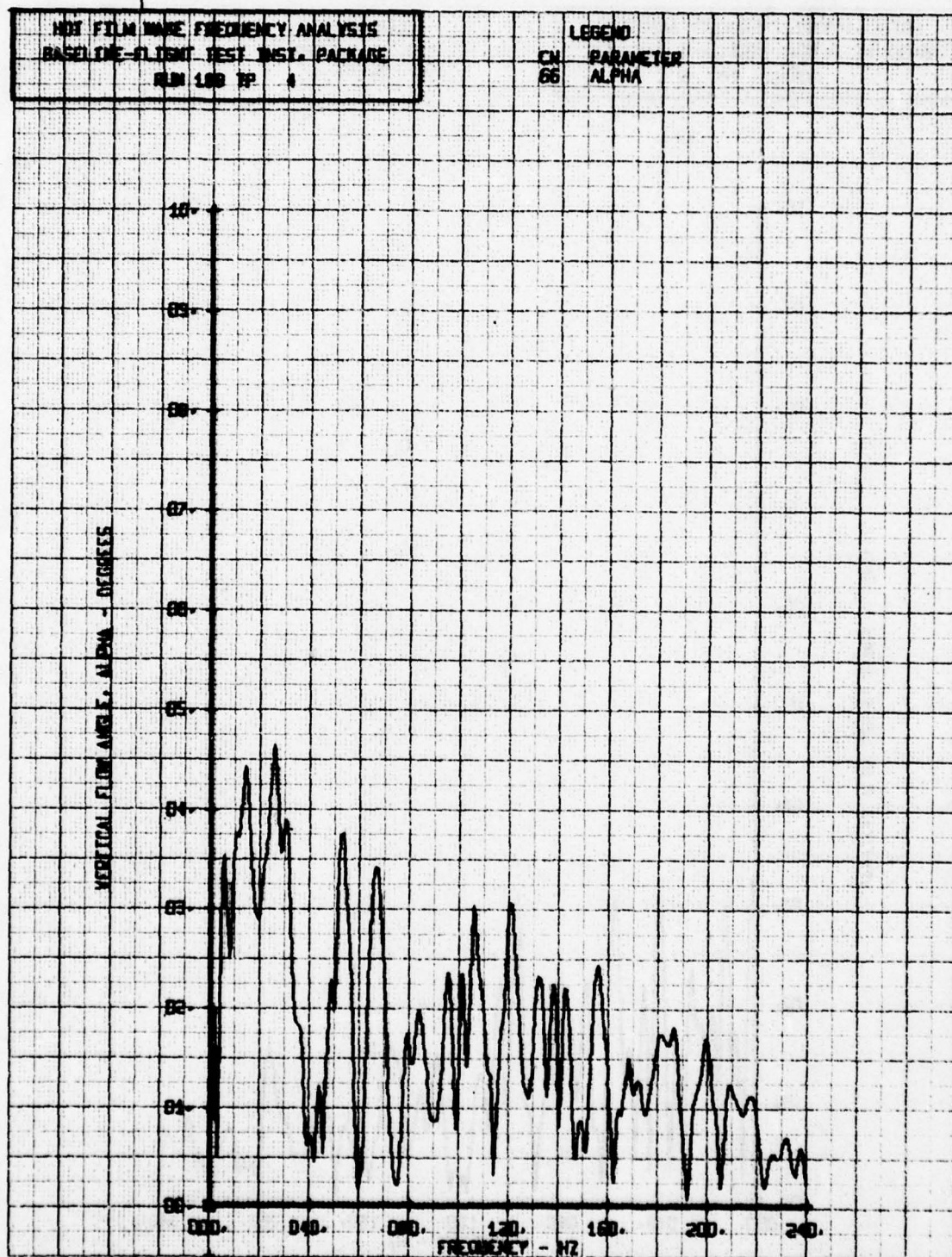
HOT FILM WARE FREQUENCY ANALYSIS
SOL. CAP. ON CAN 7-60-2-KSH-1 (M-2-1)
RUN 207 TP 8

LEGEND
CH 65
PARAMETER
V-BETA



NOI FILM WAVE FREQUENCY ANALYSIS
BASELINE FLIGHT TEST INST. PACKAGE
RUN 100 RP 4

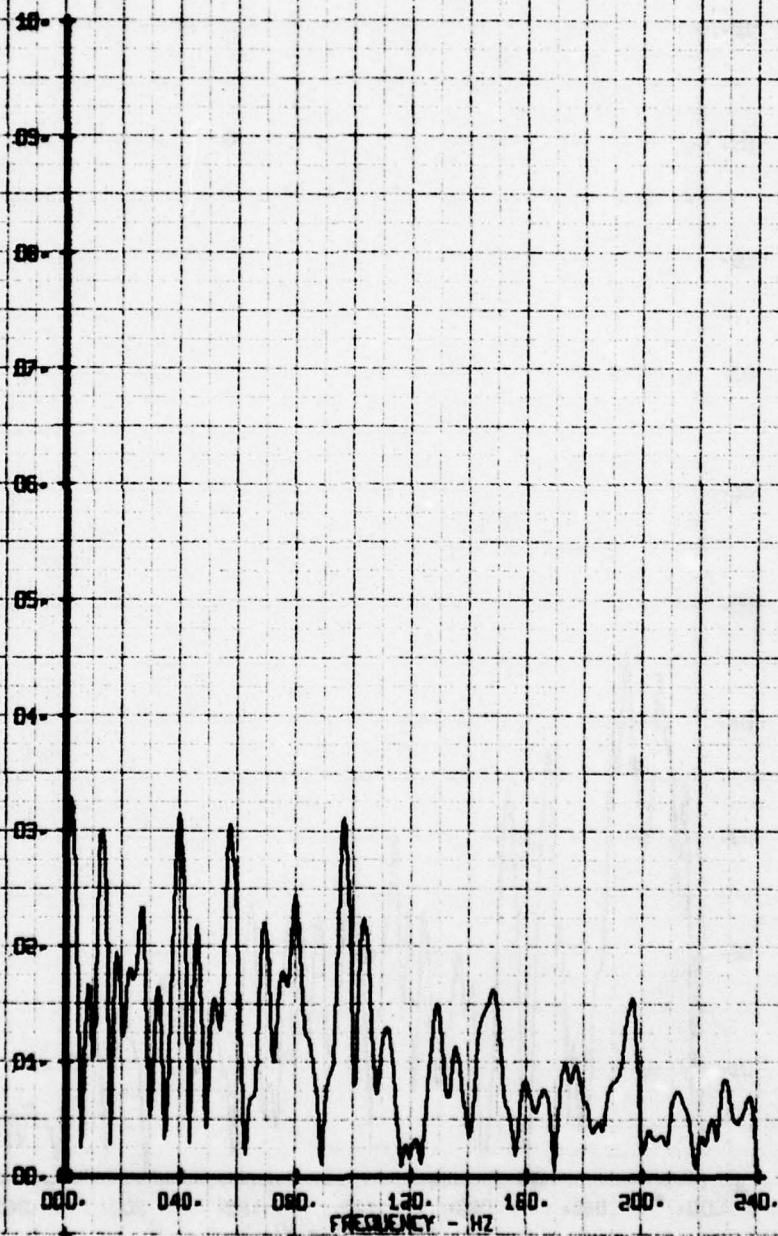
LEGEND
CH 66
PARAMETER
ALPHA



HOT FILM WIRE FREQUENCY ANALYSIS
BASELINE-FLUENT TEST INST. PACKAGE
RUN 100 TP 5

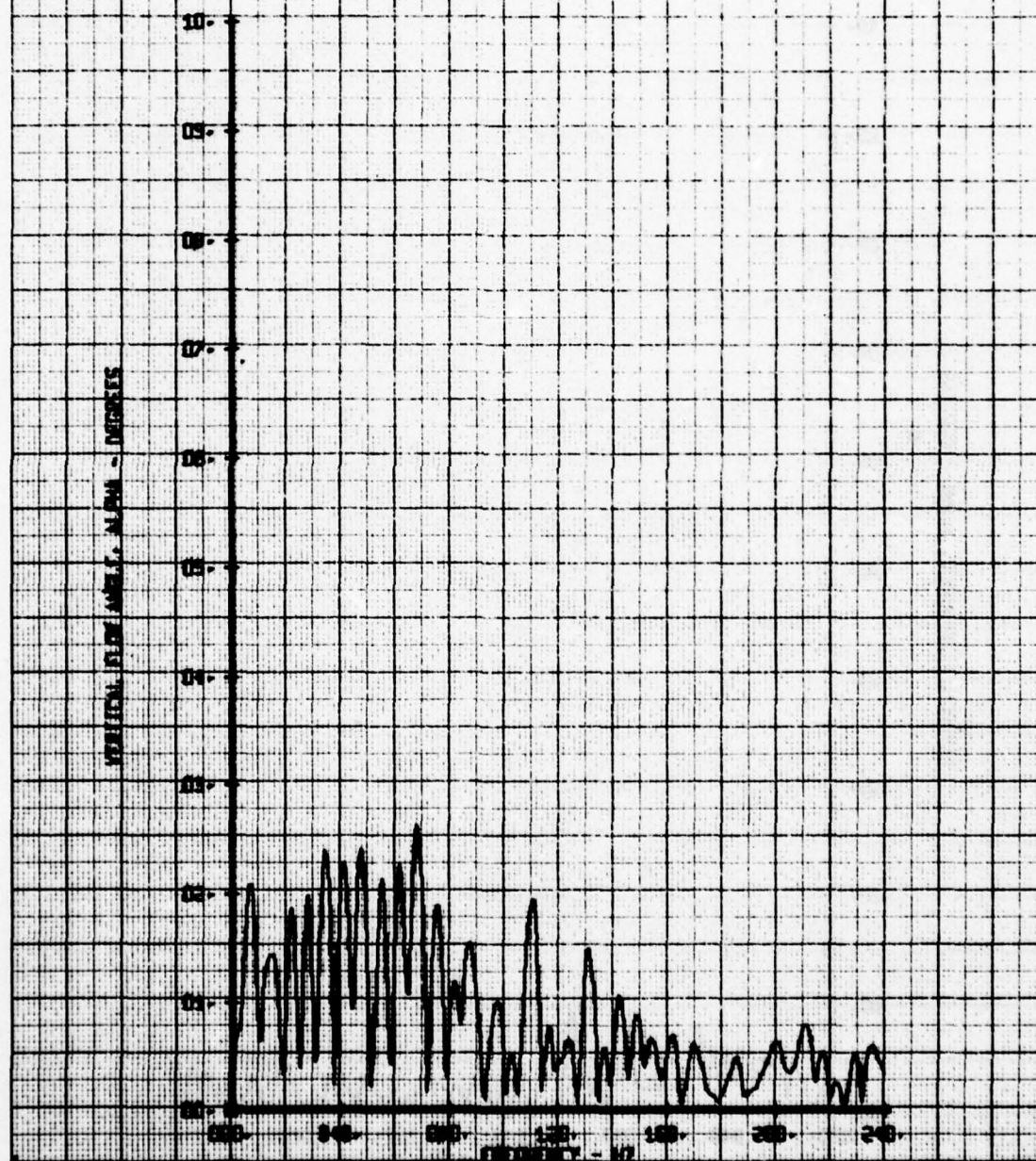
LEGEND
CH 66
PARAMETER
ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE FLIGHT TEST INST. PACKAGE
RUN 100 TP 6

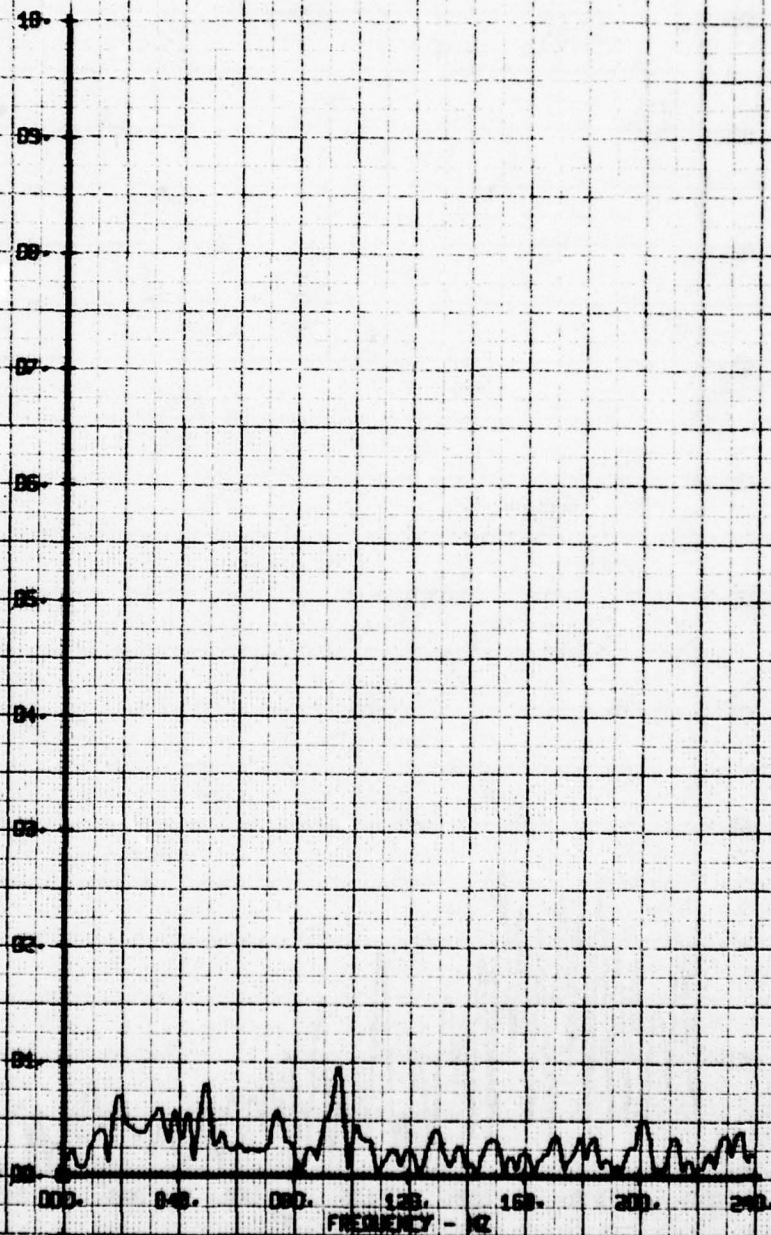
LEGEND
EN 66 PARAMETER
ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 180 TP 7

LEGEND
CH 66 PARAMETER
ALPHA

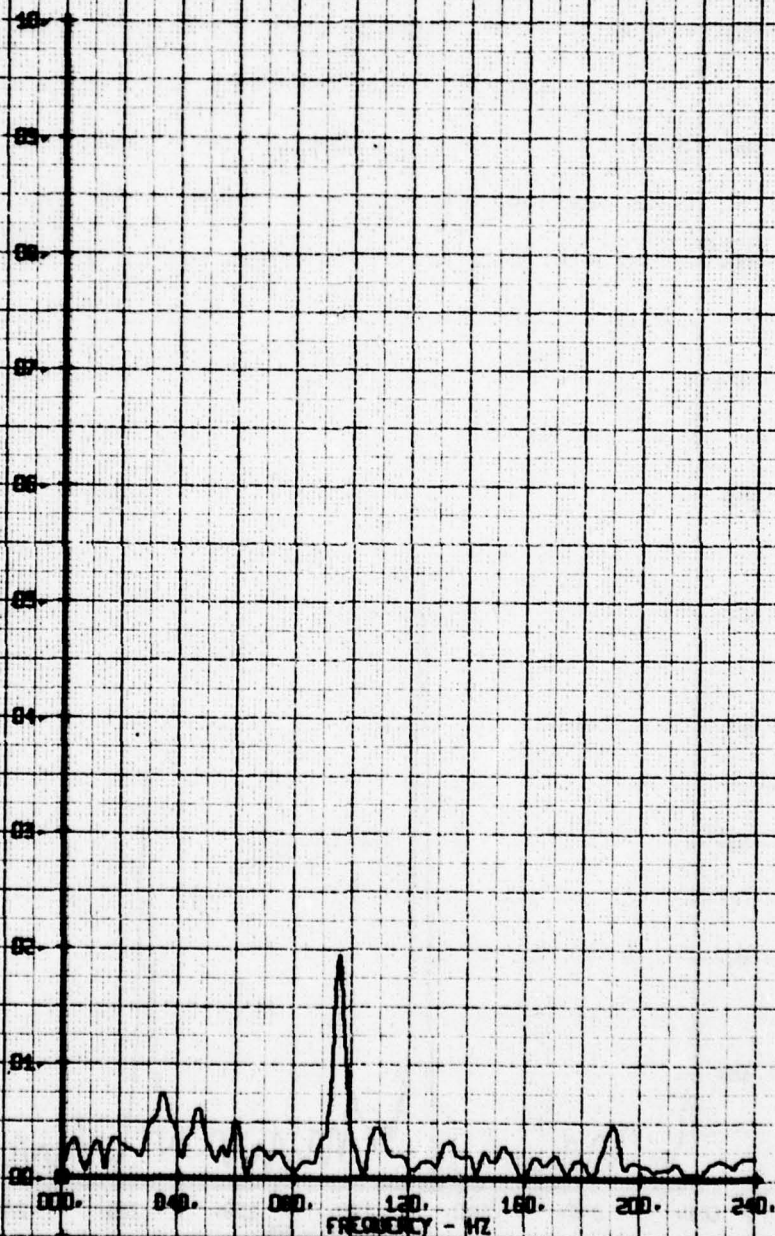
VERTICAL FLOW ANGLE, ALPHA - DEGREES



NOT TO SCALE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RIM 100 TP 3

LEGEND
CH PARAMETER
66 ALPHA

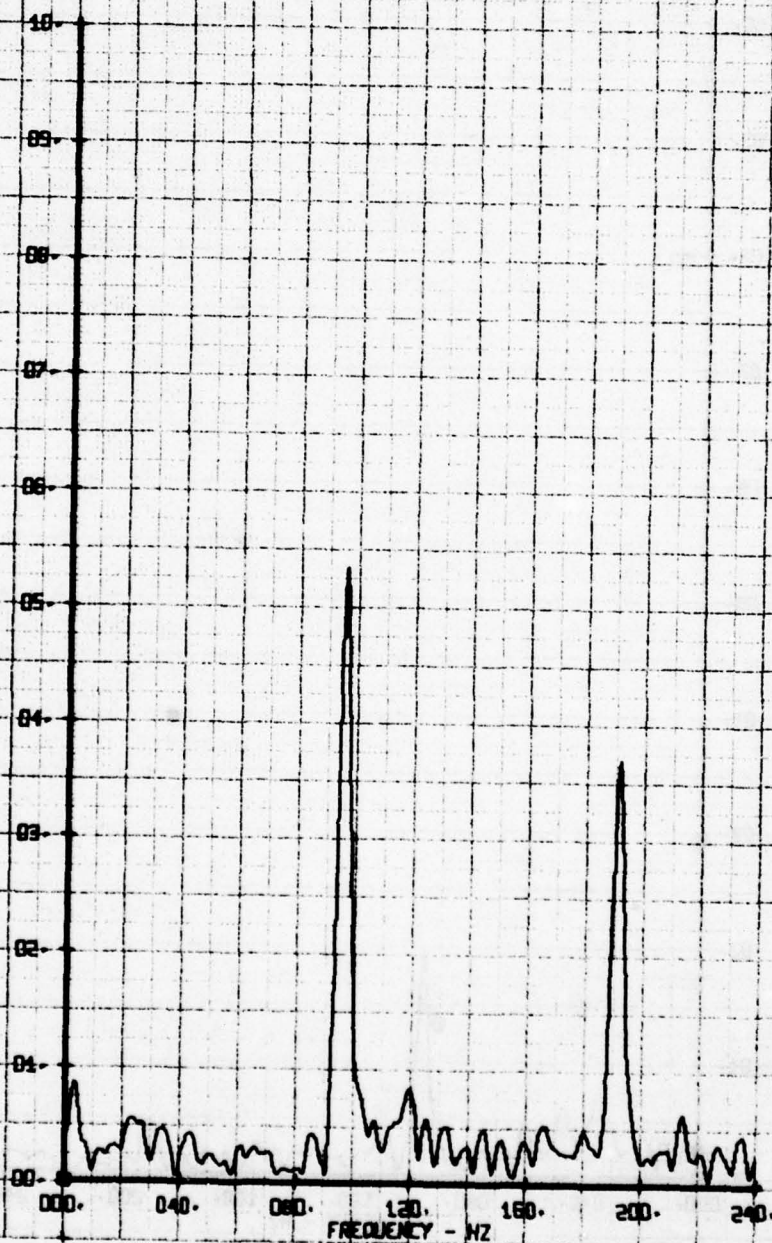
VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-01 TEST TEST INST. PACKAGE
RUN 188 TP 9

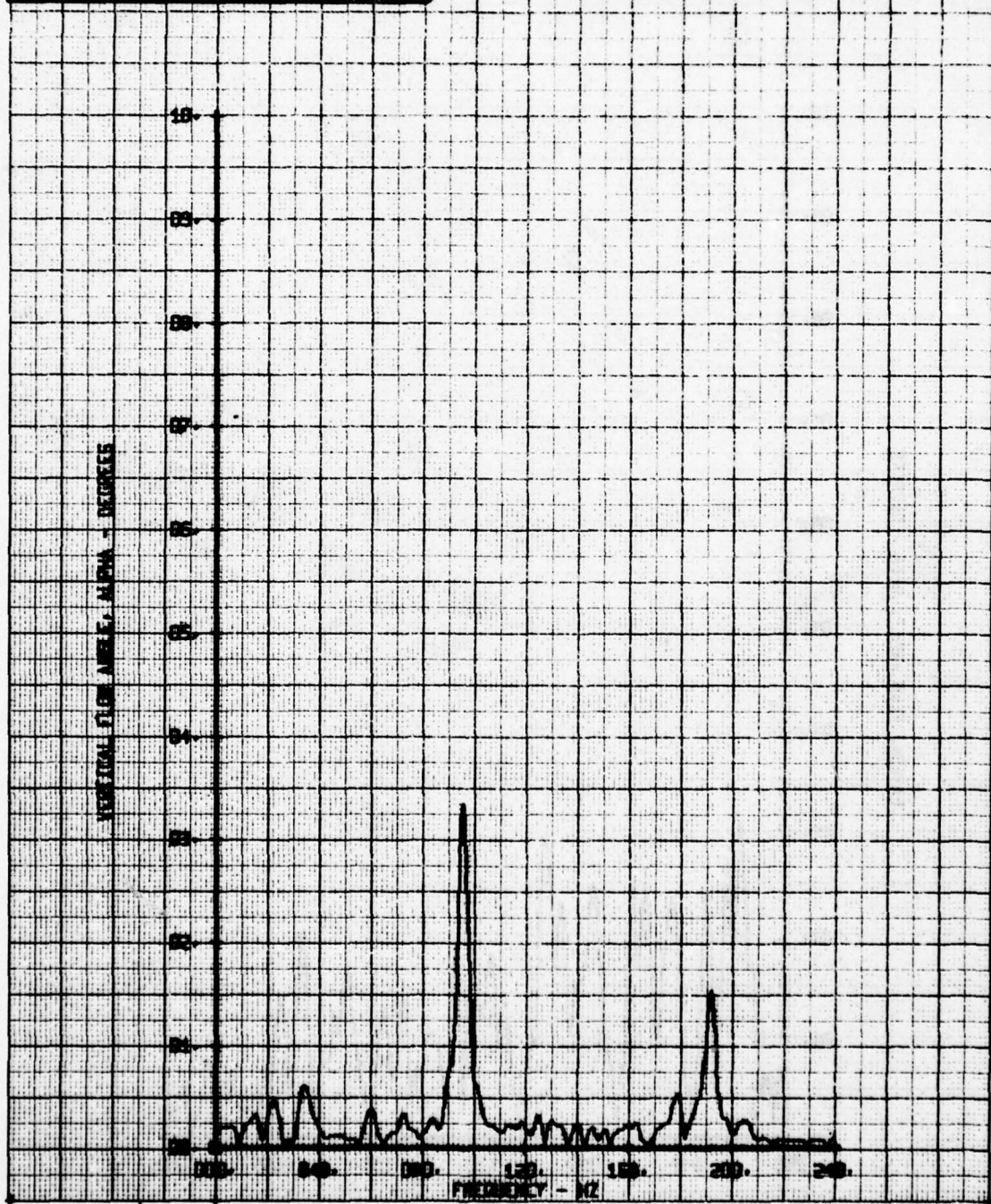
LEGEND
CH 66
PARAMETER
ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 188 TP 10

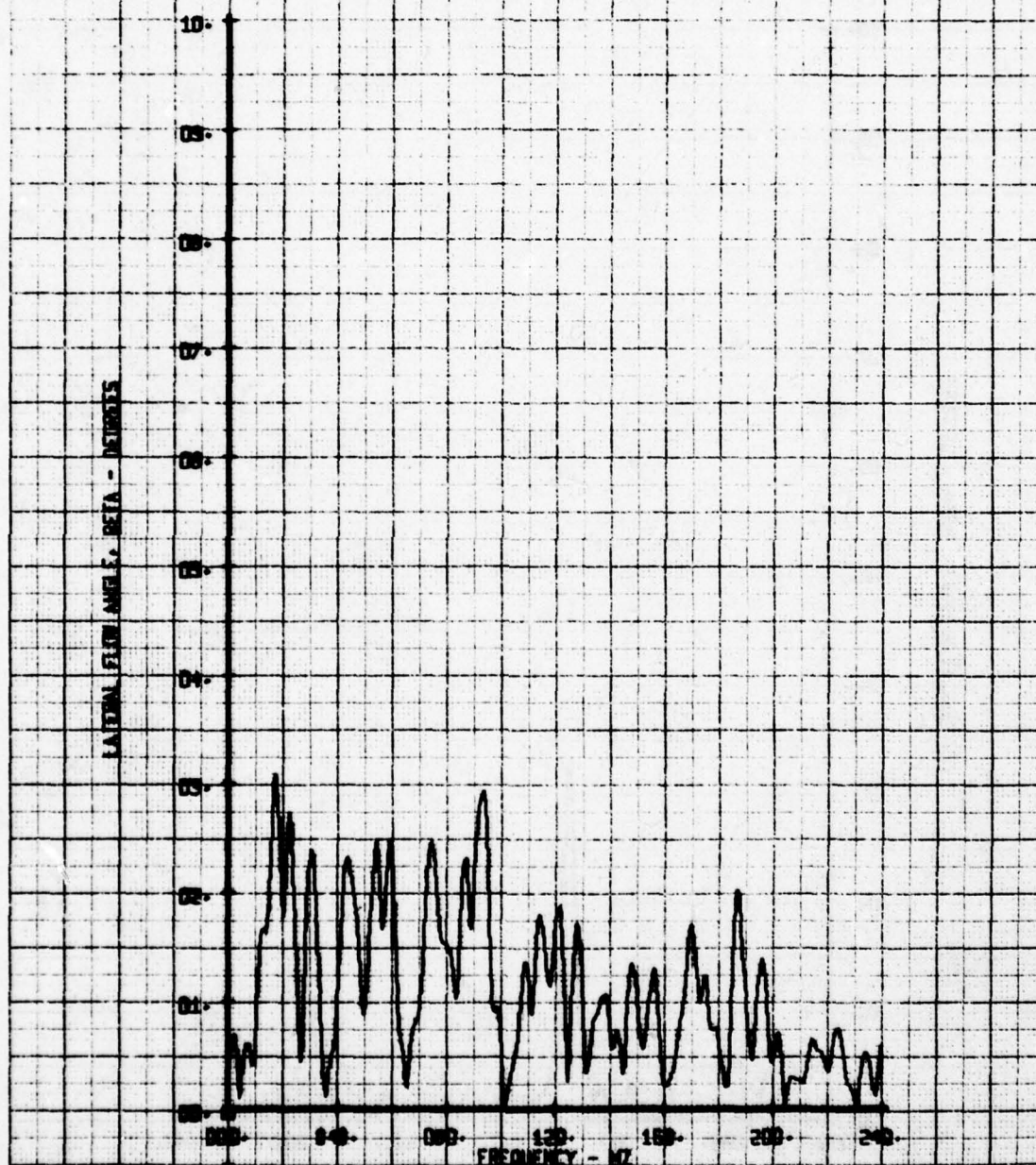
LEGEND
CH 66 PARAMETER
ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE FLIGHT TEST INST - PACKAGE
RUN 100 TP 4

LEGEND
CH 65
PARAMETER
BETA

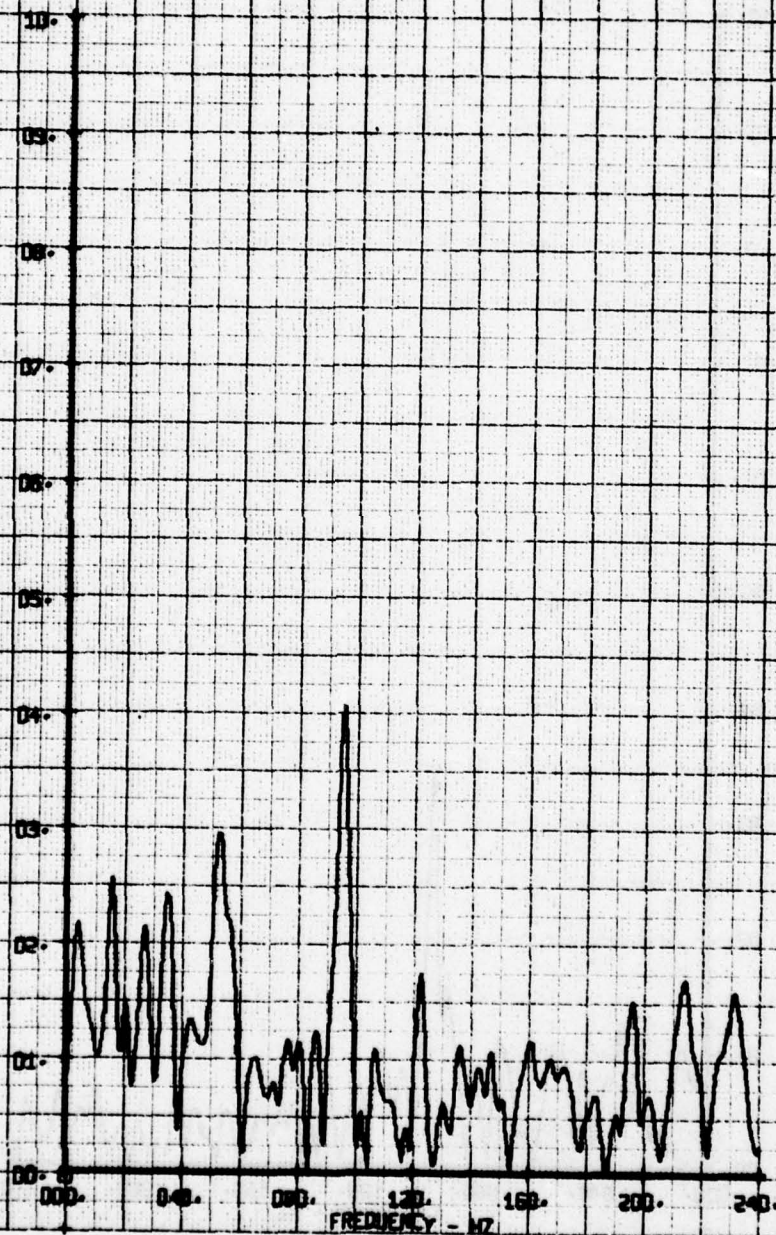
LATERAL FLOW ANGLE - BETA - DEGREES



HOT FILM WIRE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 100 TP 5

LEGEND
D1 PARAMETER
B5 BETA

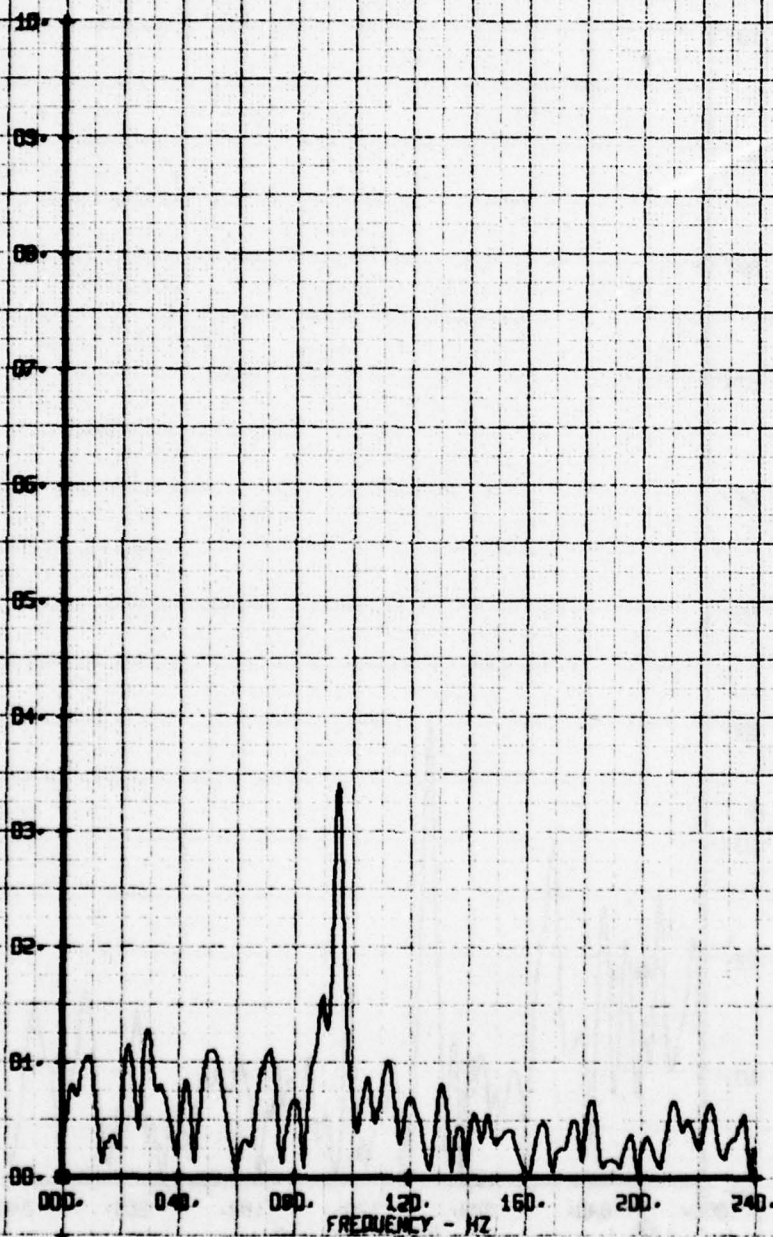
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WIRE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 100 TP 6

LEGEND
CH 65
PARAMETER
BETA

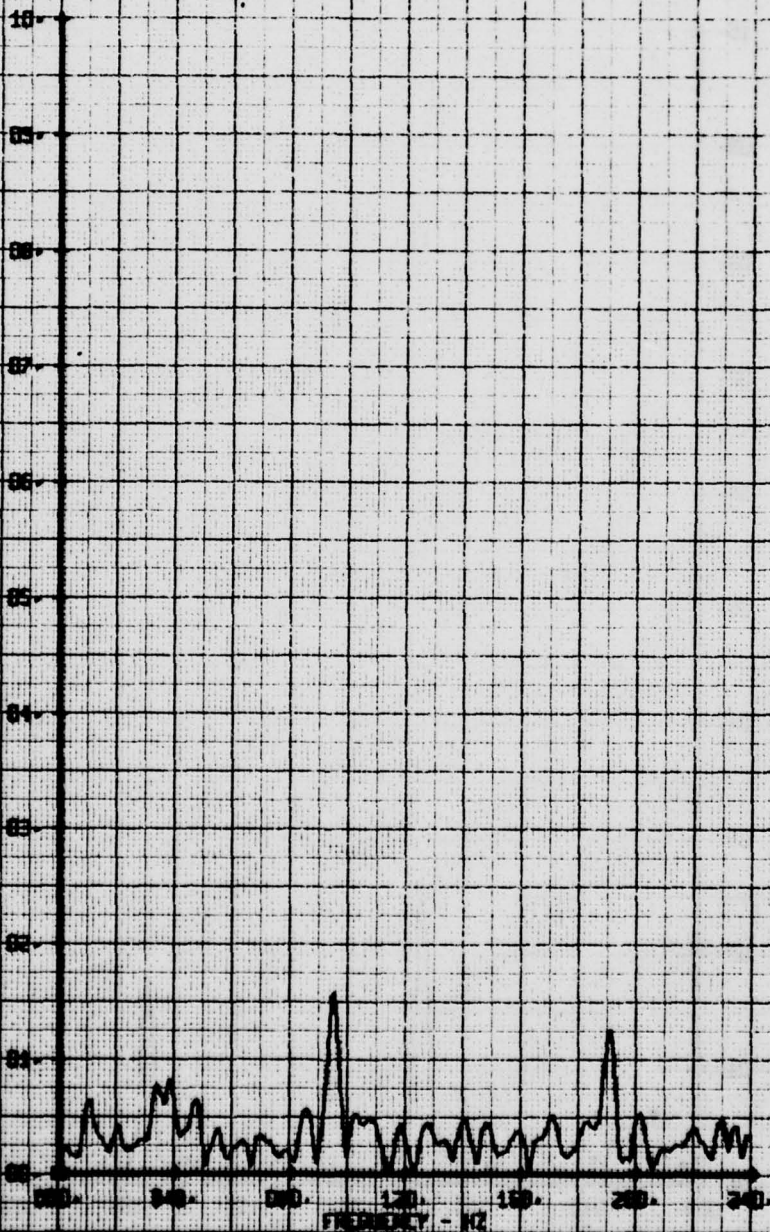
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 100 TP 7

LEGEND
CH 65 PARAMETER
BETA

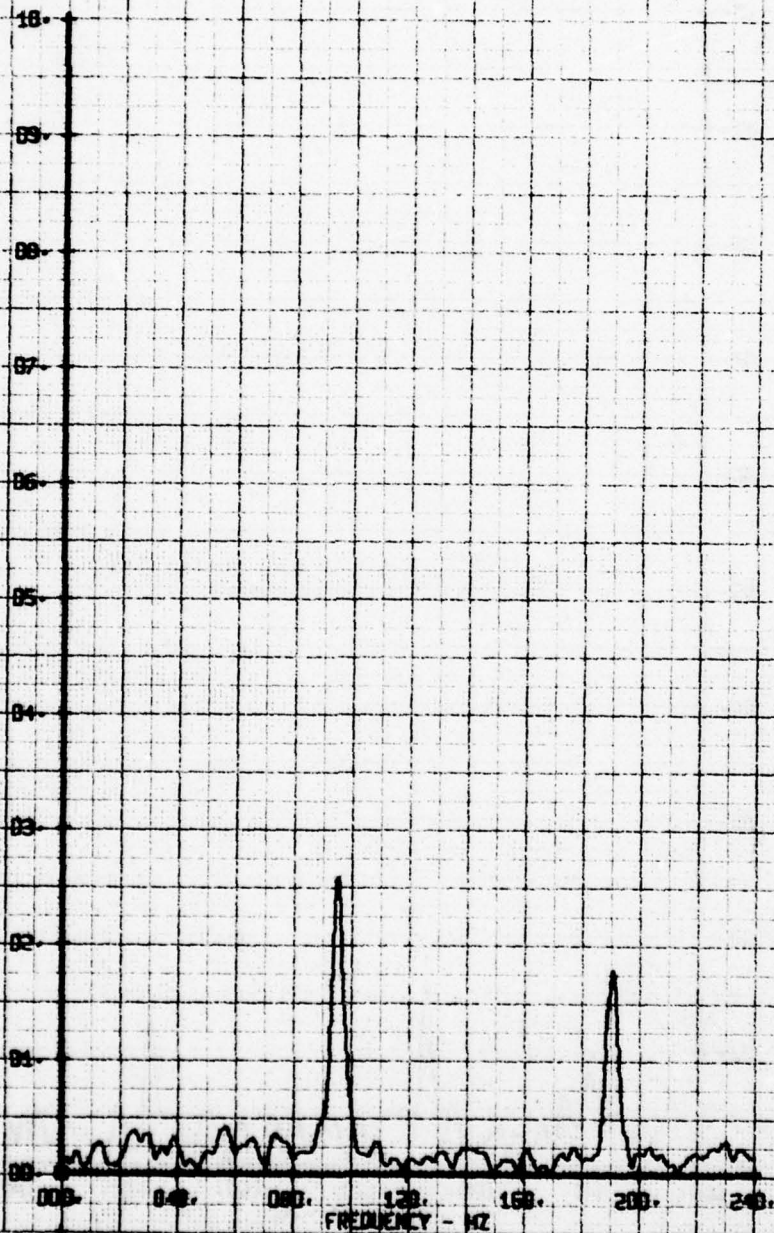
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 188 TP 8

LEGEND
CH 65 PARAMETER
BETA

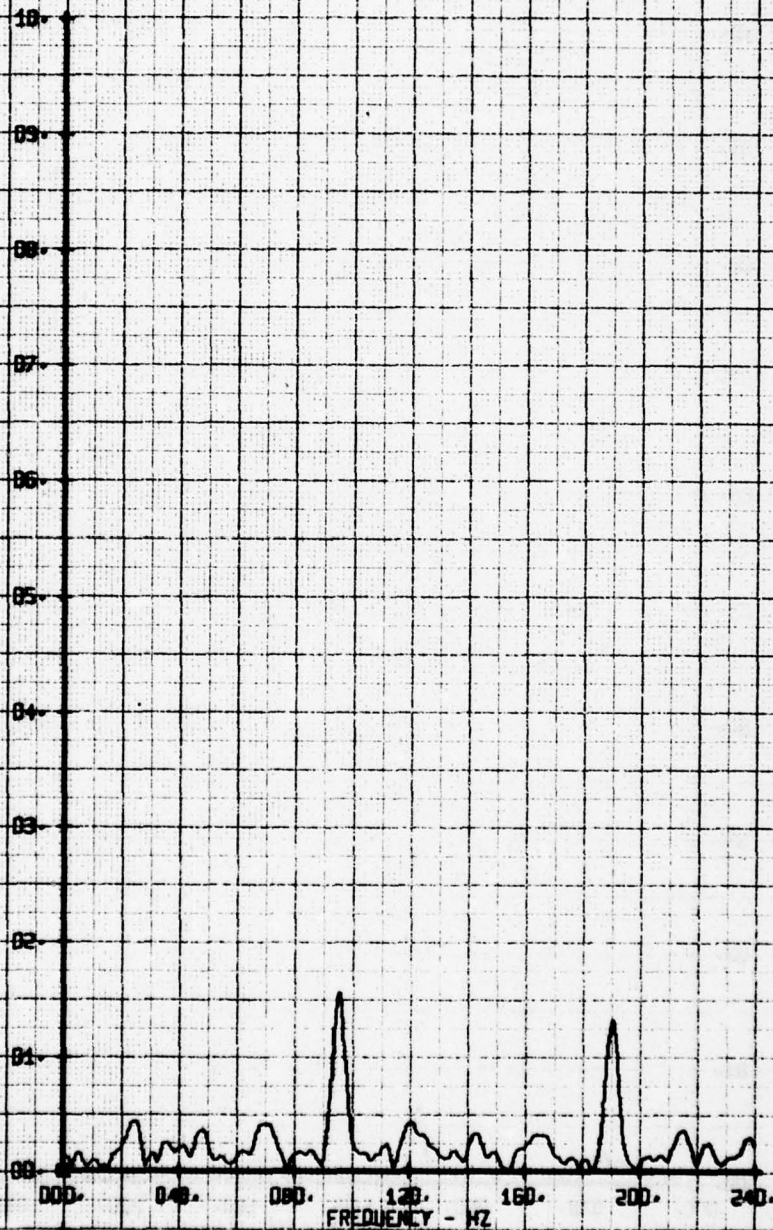
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 100 TP 9

LEGEND
CH PARAMETER
BS BETA

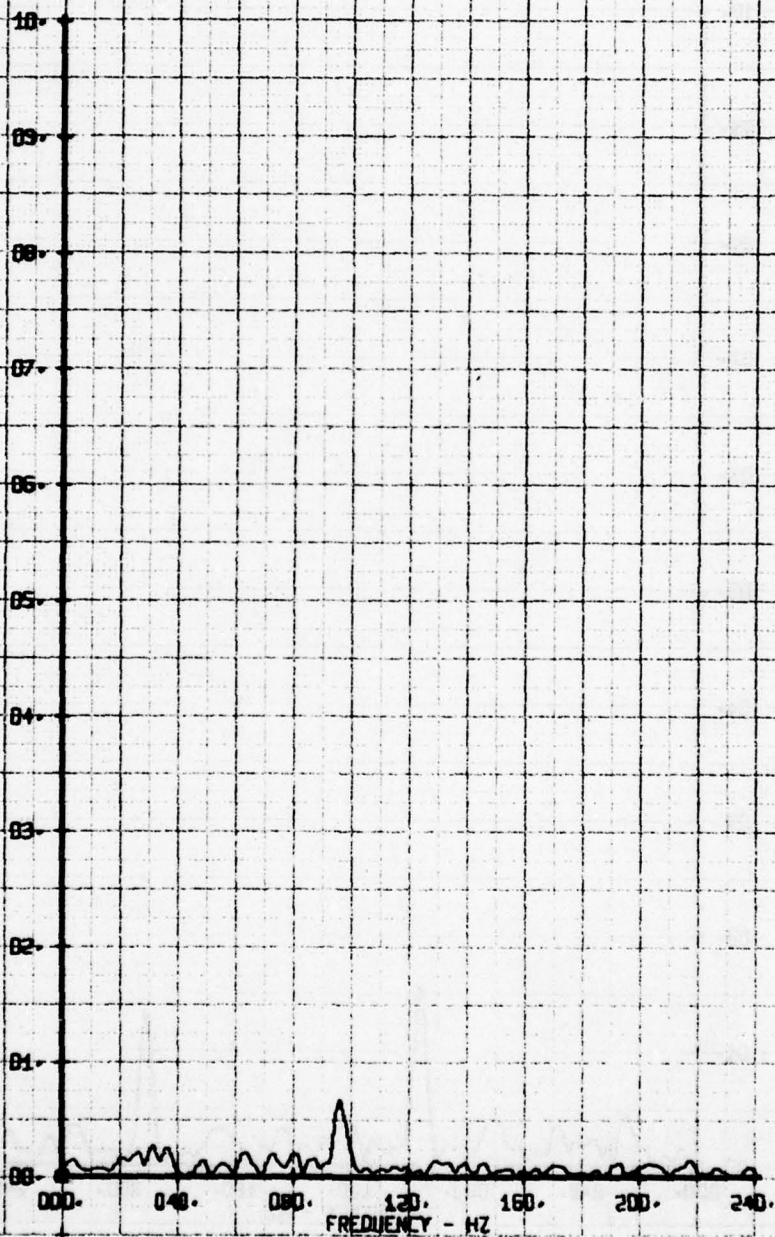
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 188 TP 10

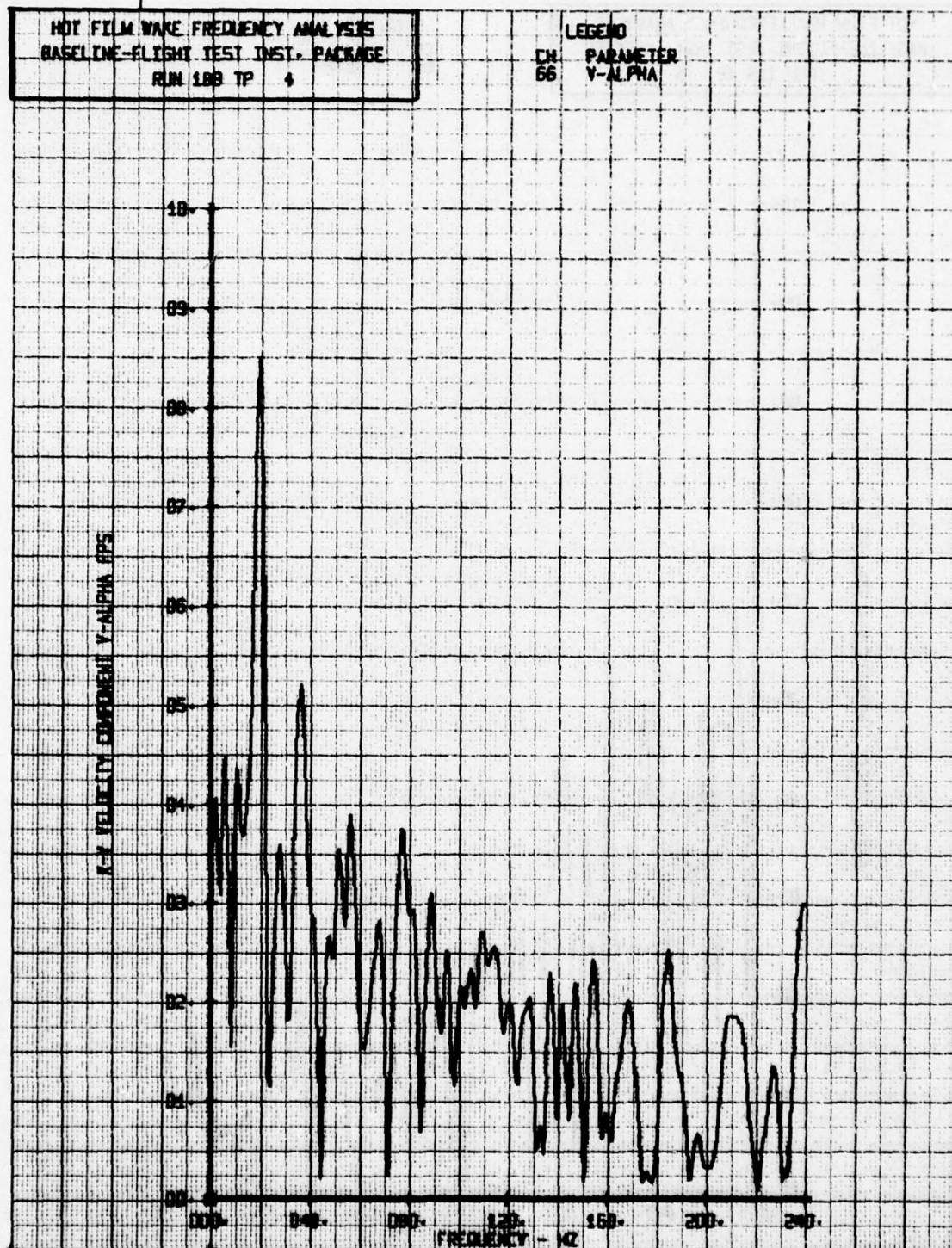
LEGEND
CH 65
PARAMETER
BETA

LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE FREQUENCY ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 4

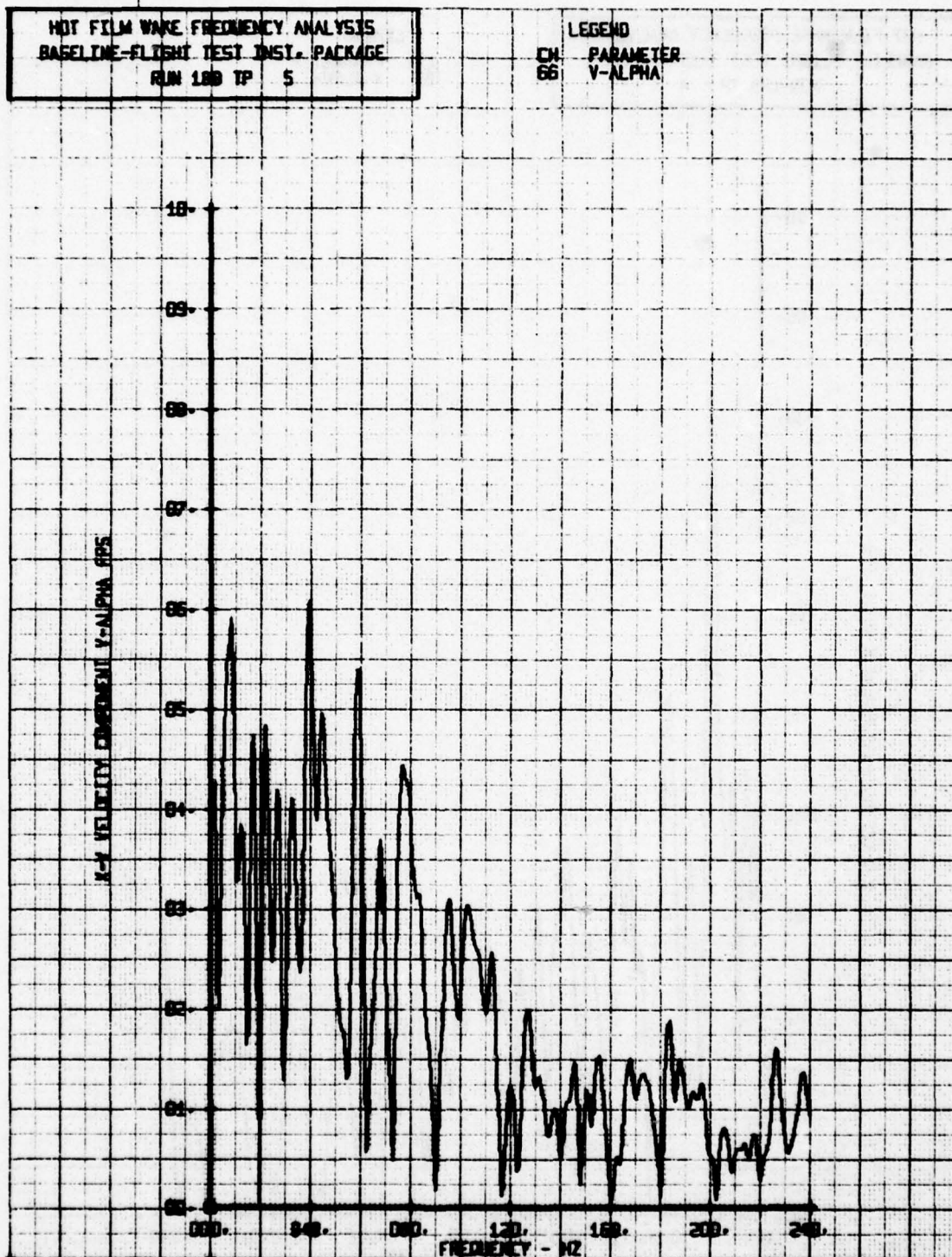
LEGEND
 CH. 66 PARAMETER
 Y-ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 100 TP 5

LEGEND
CH PARAMETER
66 V-ALPHA

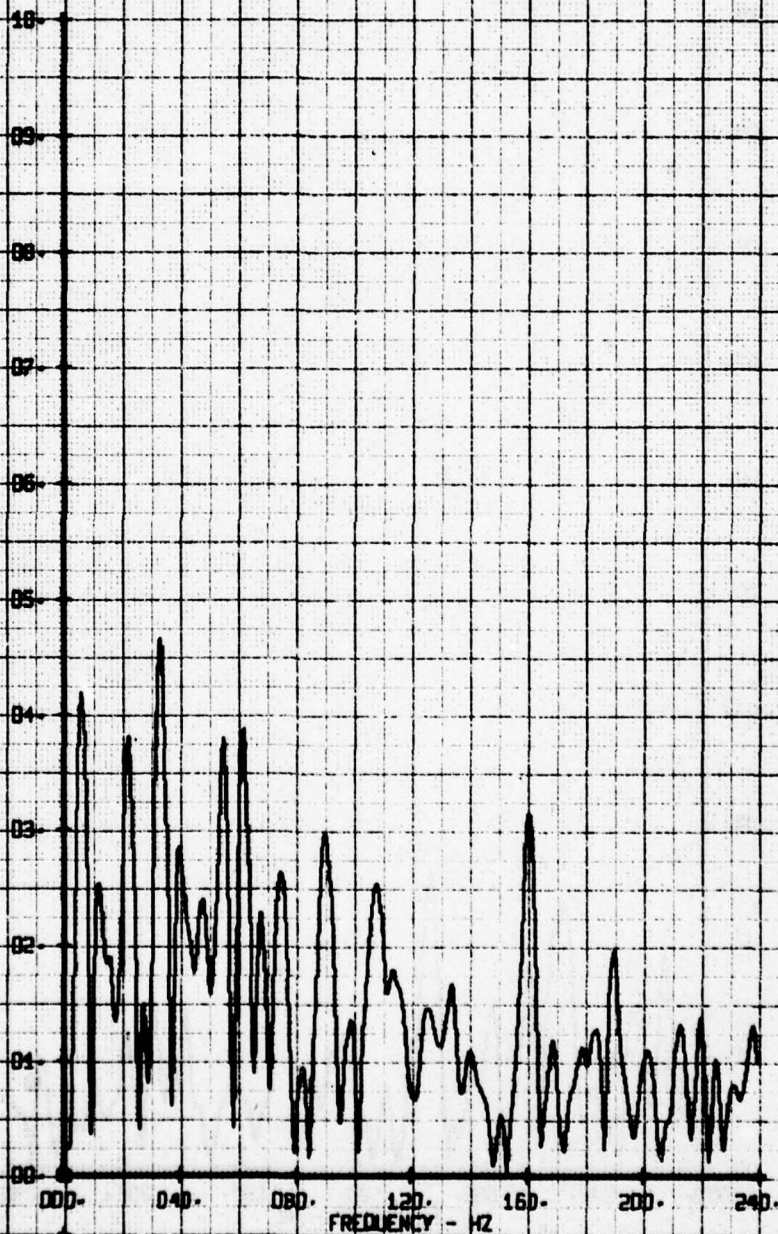
V-ALPHA COMPONENT V-ALPHA RMS



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 100 TP 6

LEGEND
CH 56
PARAMETER
V-ALPHA

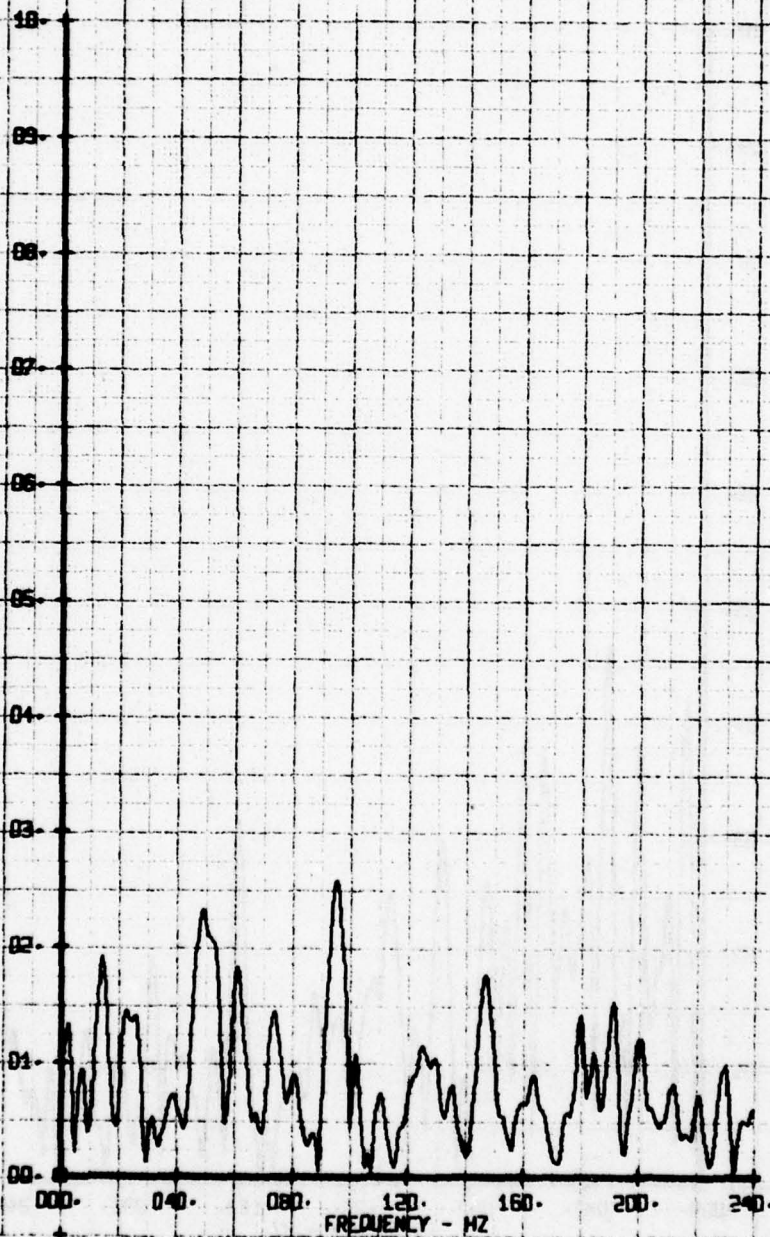
X-Y VELOCITY COMPONENT V-ALPHA RPS



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 100 TP 7

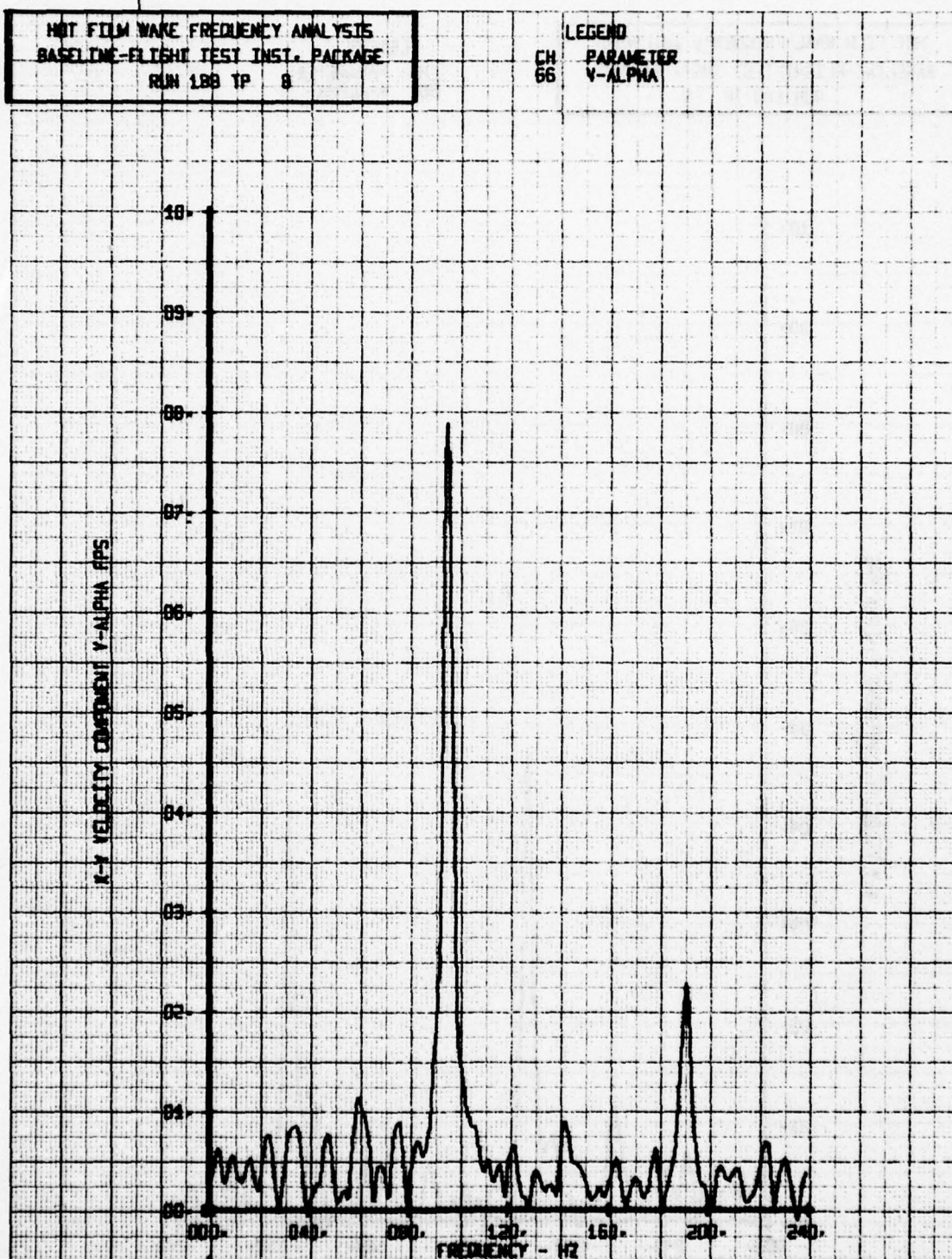
LEGEND
CH 66 PARAMETER
V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



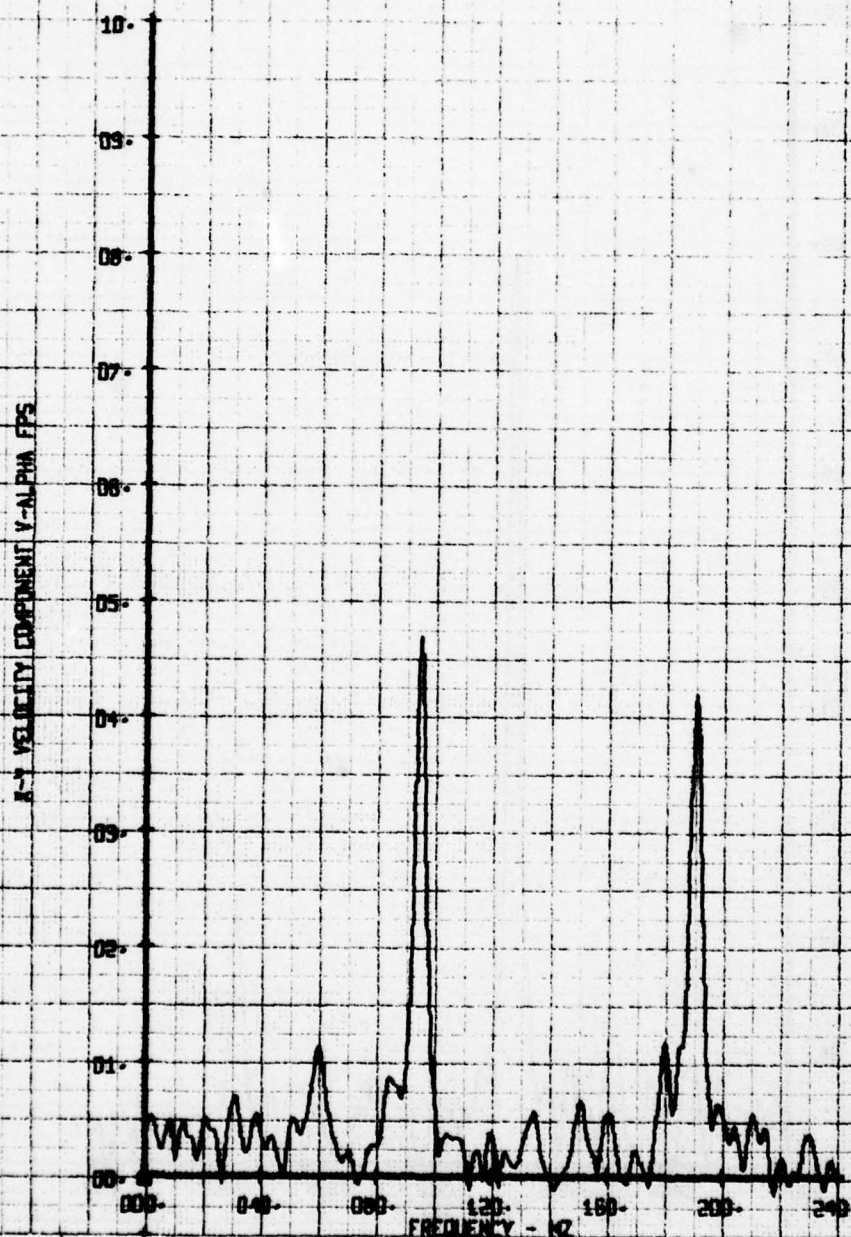
HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 188 TP 8

LEGEND
CH 66
PARAMETER
V-ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST- PACKAGE
RUN 180 TP 9

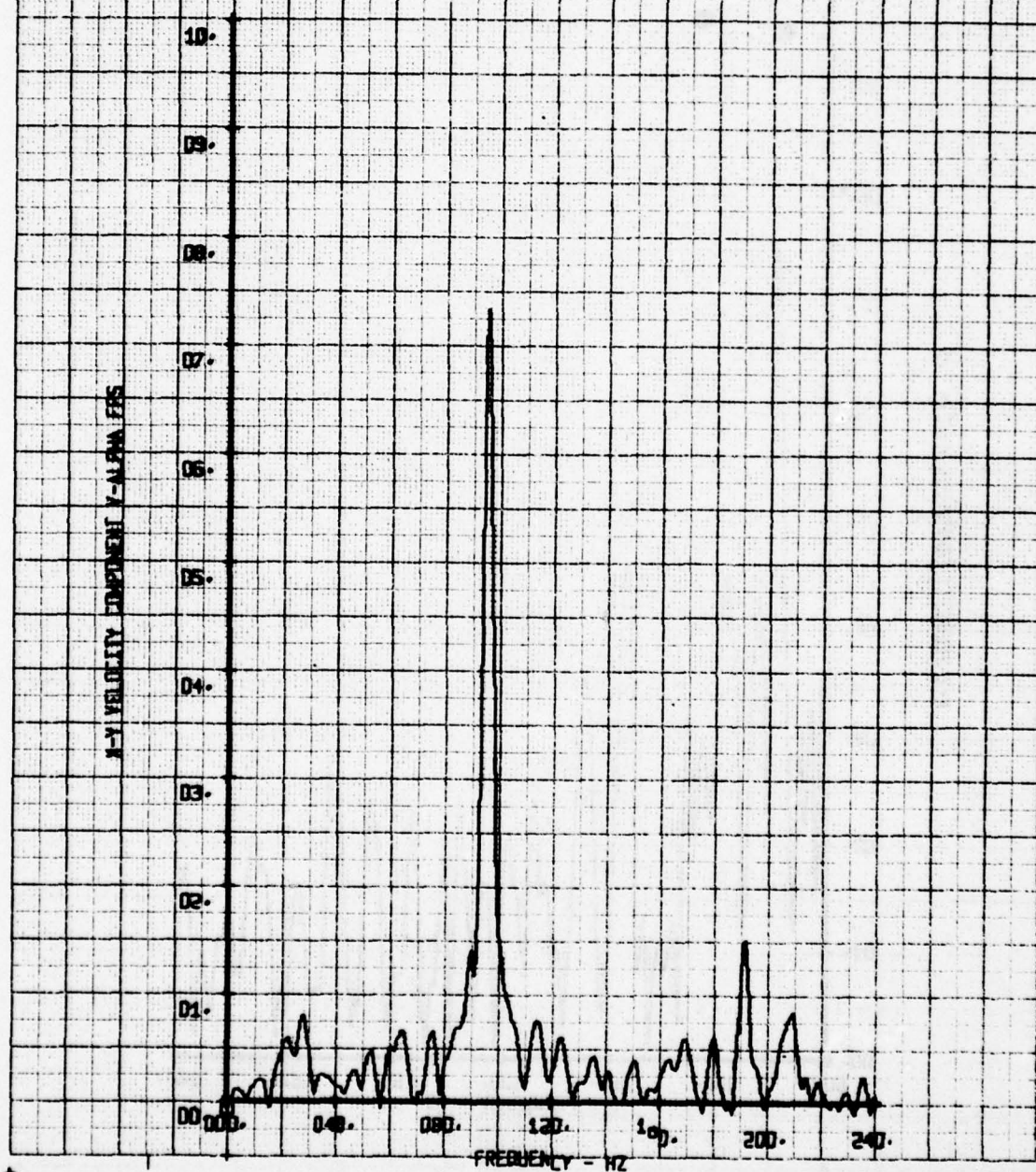
LEGEND
CH 66 PARAMETER
V-ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 100 TP 10

LEGEND
CH 66 PARAMETER
V-ALPHA

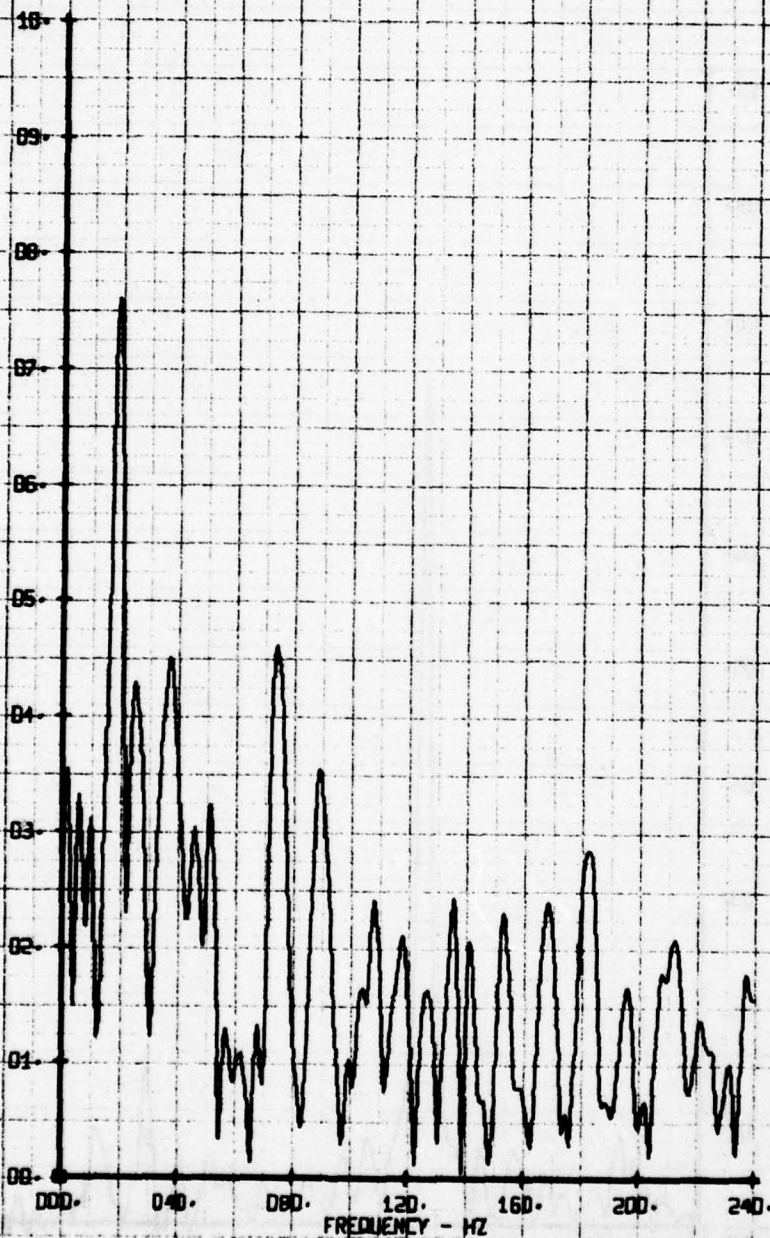
N-Y VELOCITY COMPONENT V-ALPHA FFS



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 188 TP 4

LEGEND
CH 65
PARAMETER
V-BETA

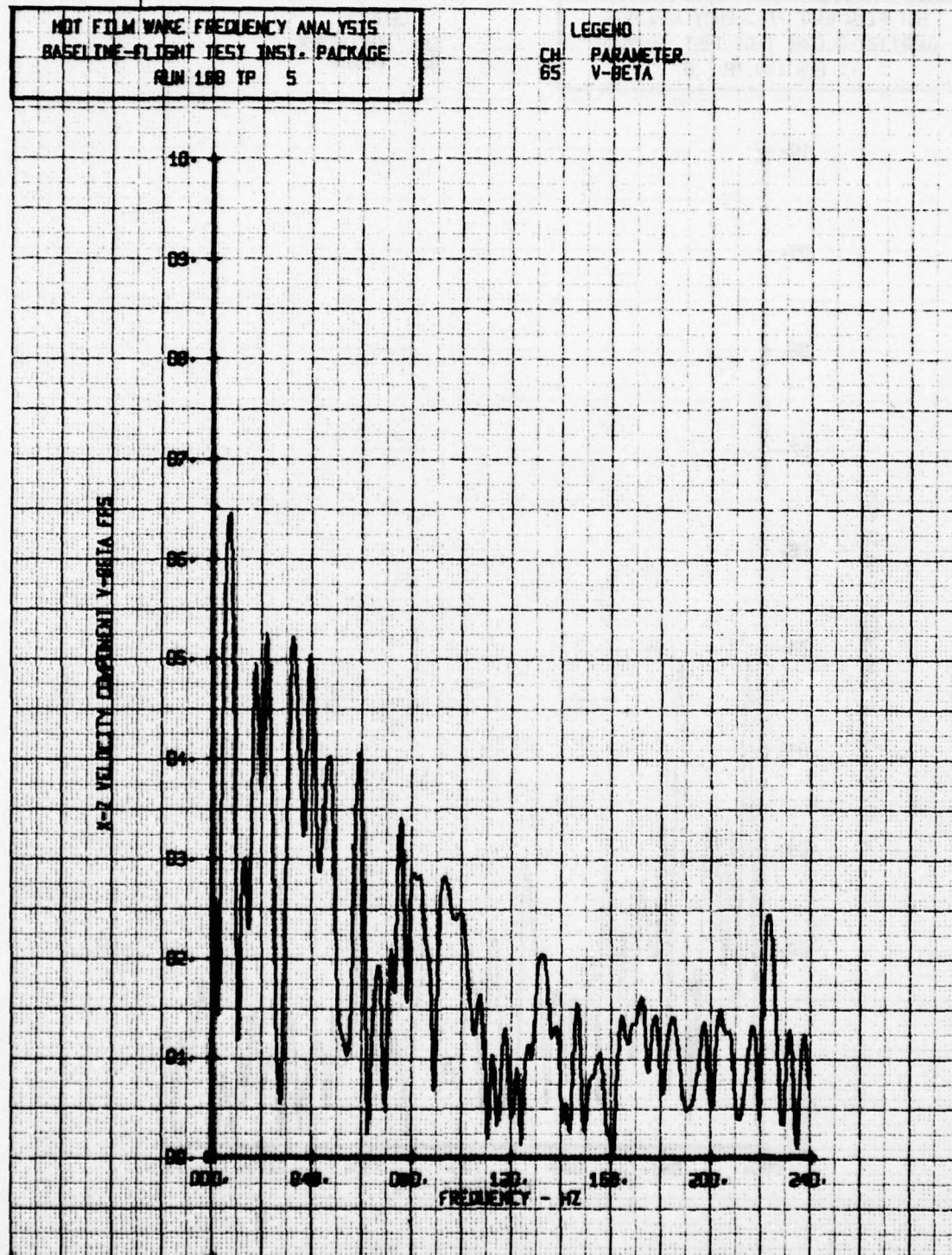
X-2 VELOCITY COMPONENT V-BETA FPS



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 188 TP 5

LEGEND
CH 65
PARAMETER
V-BETA

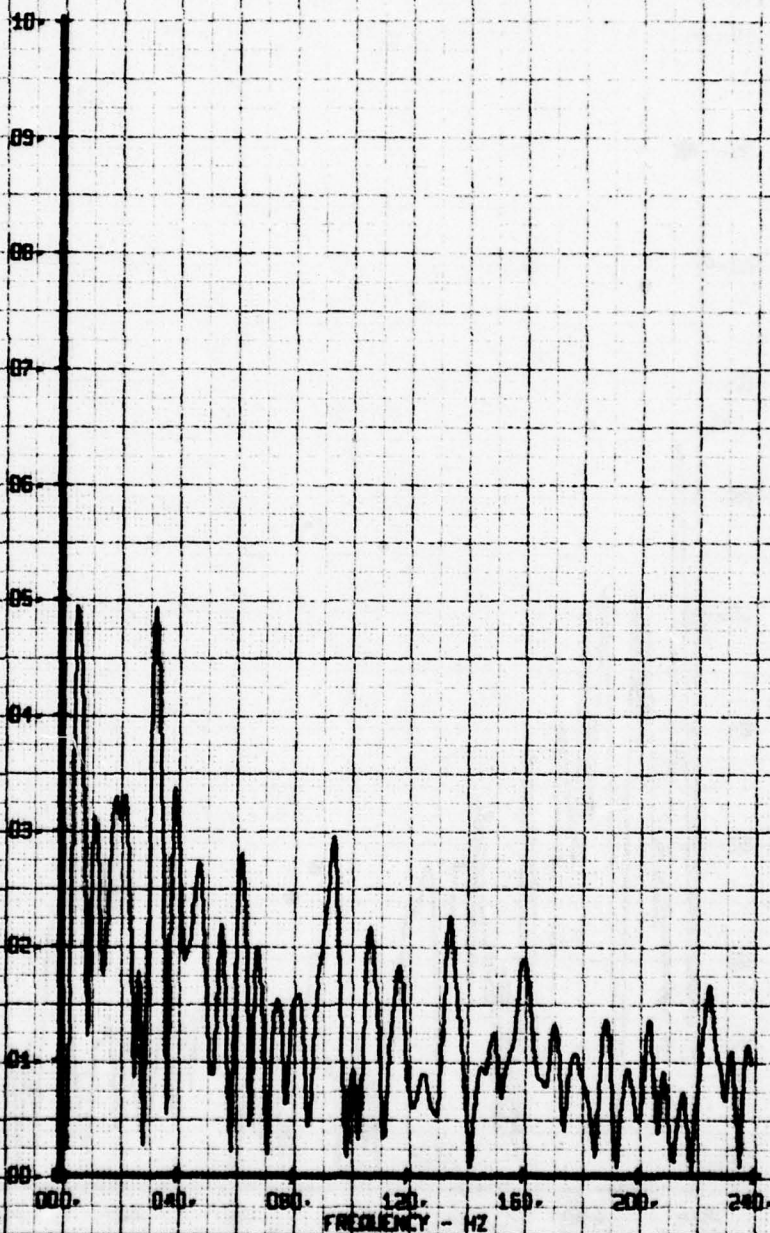
X-Z VELOCITY COMPONENT V-BETA EPS



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-ELTENT TEST INST. PACKAGE
RUN 188 TP 6

LEGEND
CH 65
PARAMETER
V-BETA

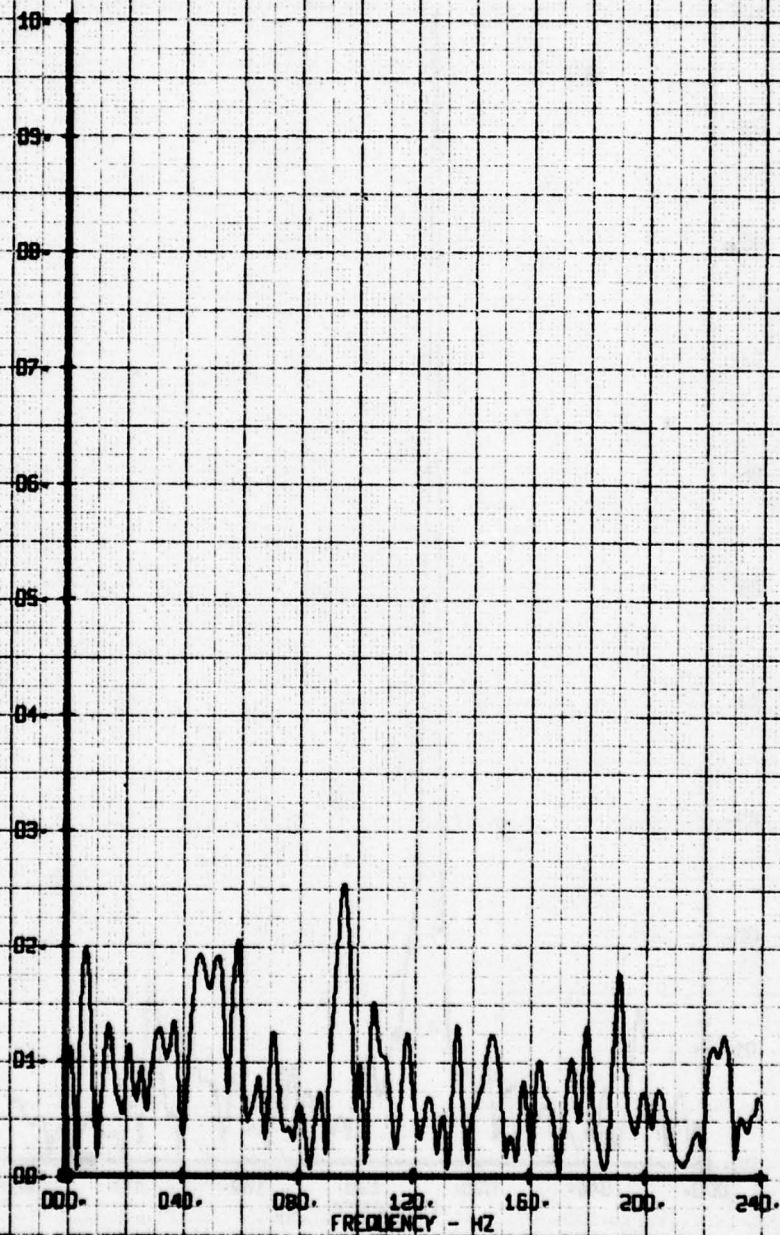
X-Z VELOCITY COMPONENT V-BETA FPS



NOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 188 TP 7

LEGEND
CH 65
PARAMETER
V-BETA

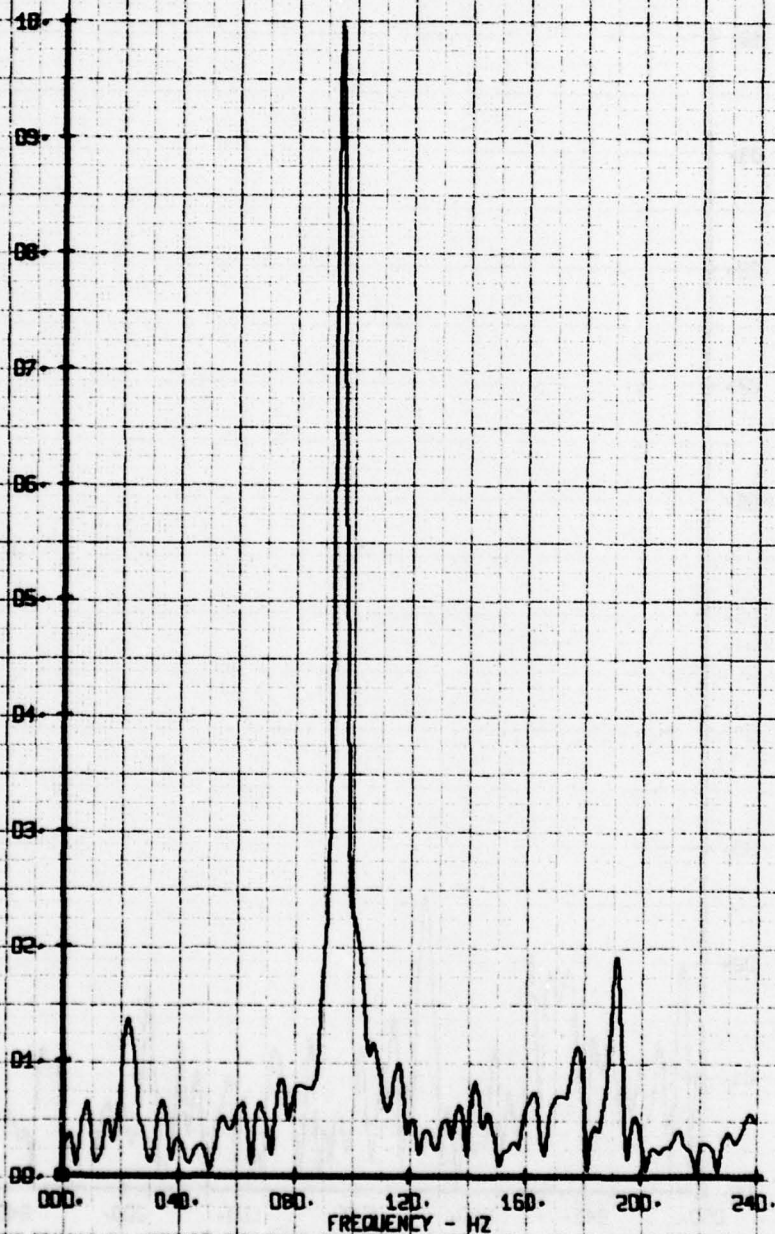
X-2 VELOCITY COEFFICIENT V-BETA PPS



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 188 TP 8

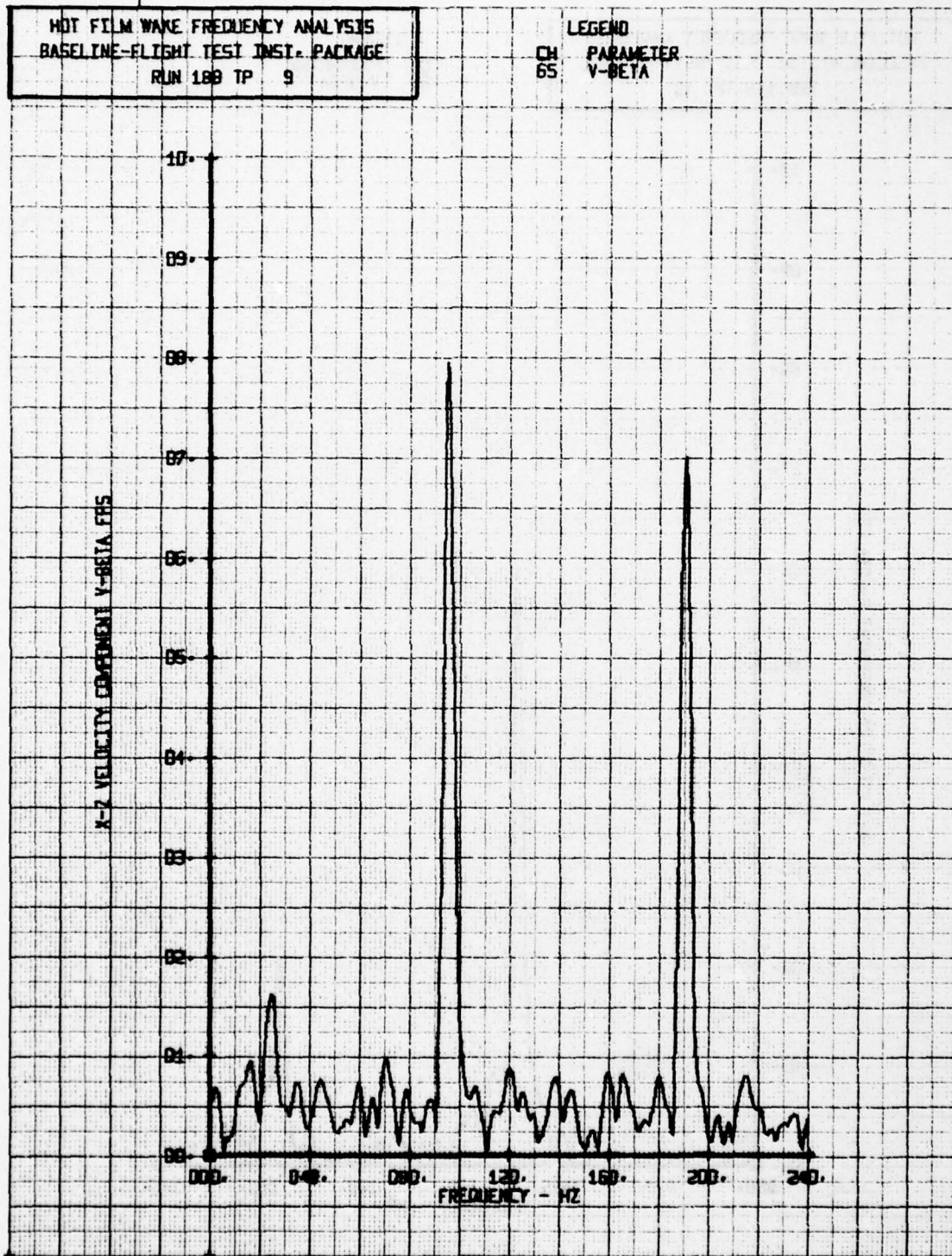
LEGEND
CH 65
PARAMETER
V-BETA

X-2 VELOCITY COMPONENT V-BETA FPS



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 188 TP 9

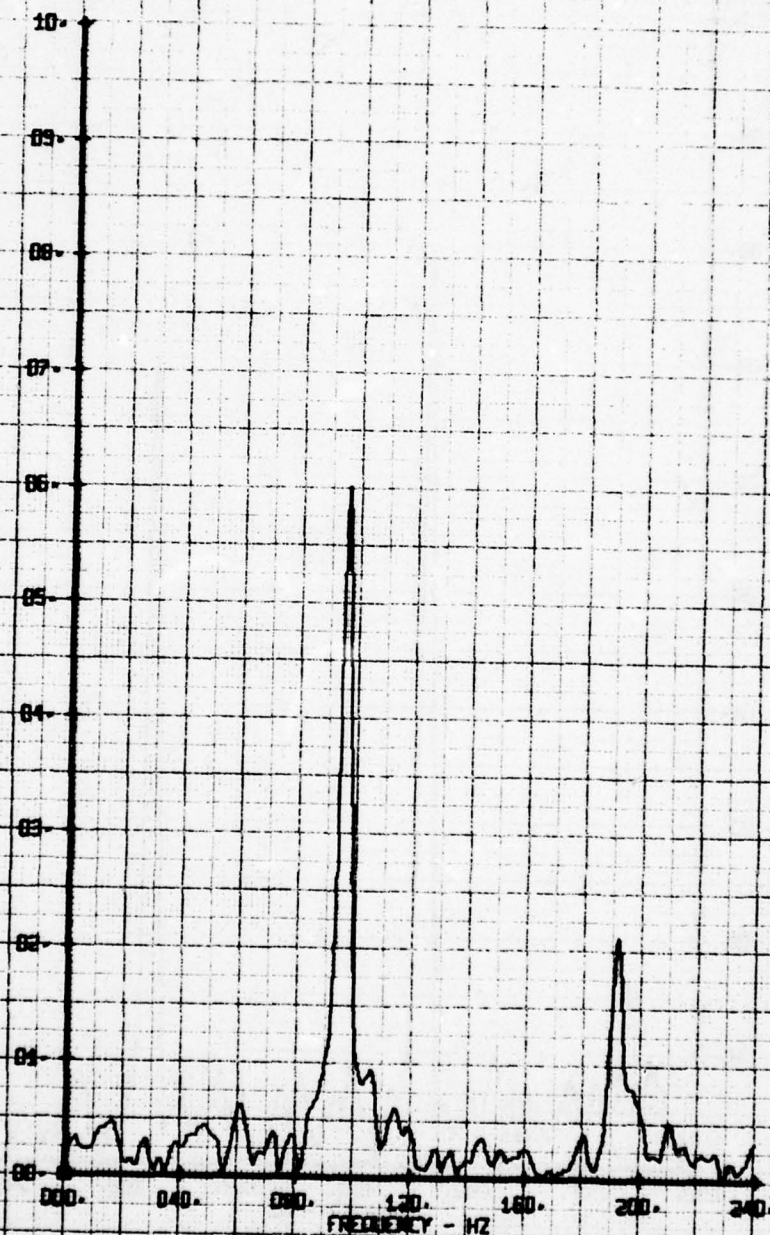
LEGEND
CH 65
PARAMETER
V-BETA



HOT FILM WAKE FREQUENCY ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 188 TP 10

LEGEND
CH. PARAMETER
65 V-BETA

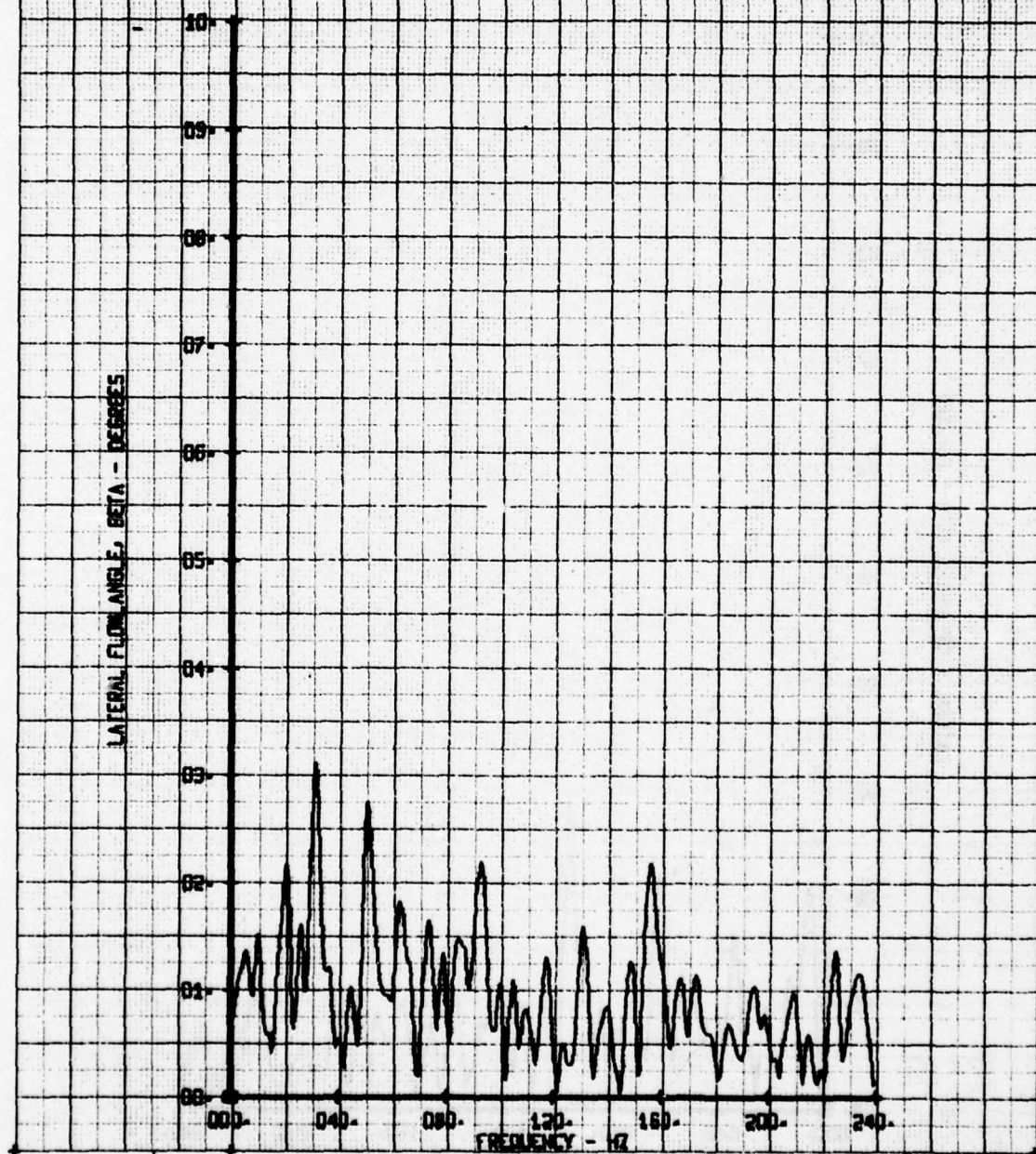
V-2 VELOCITY COMPONENT V-BETA FHS



1. INT. FILM NAME FREQUENCY ANALYSIS
 2. ANALYST: C. L. L. S. A. M. 28-58
 3. RUN 200 TP 2

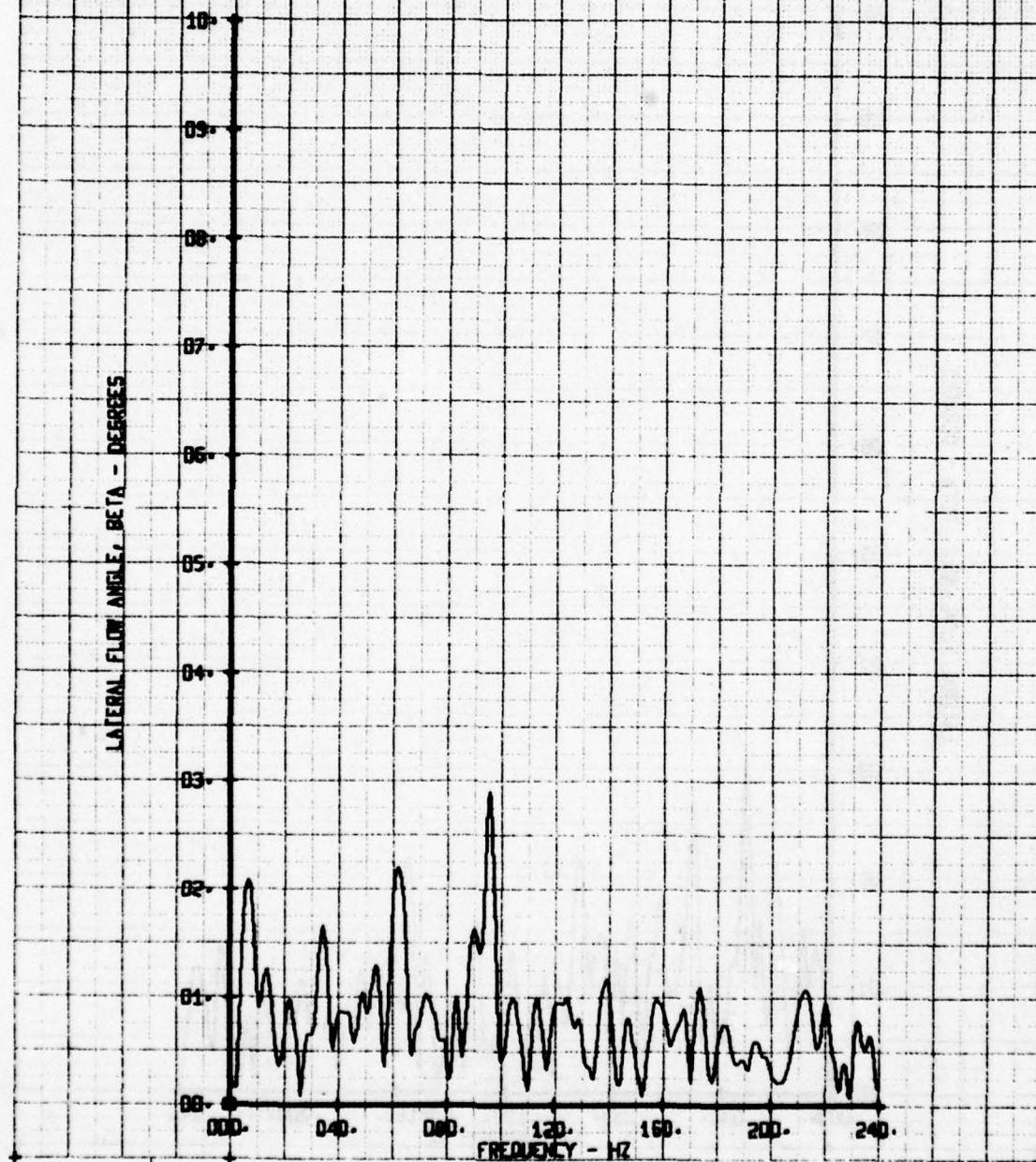
L0000
 CH 85
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



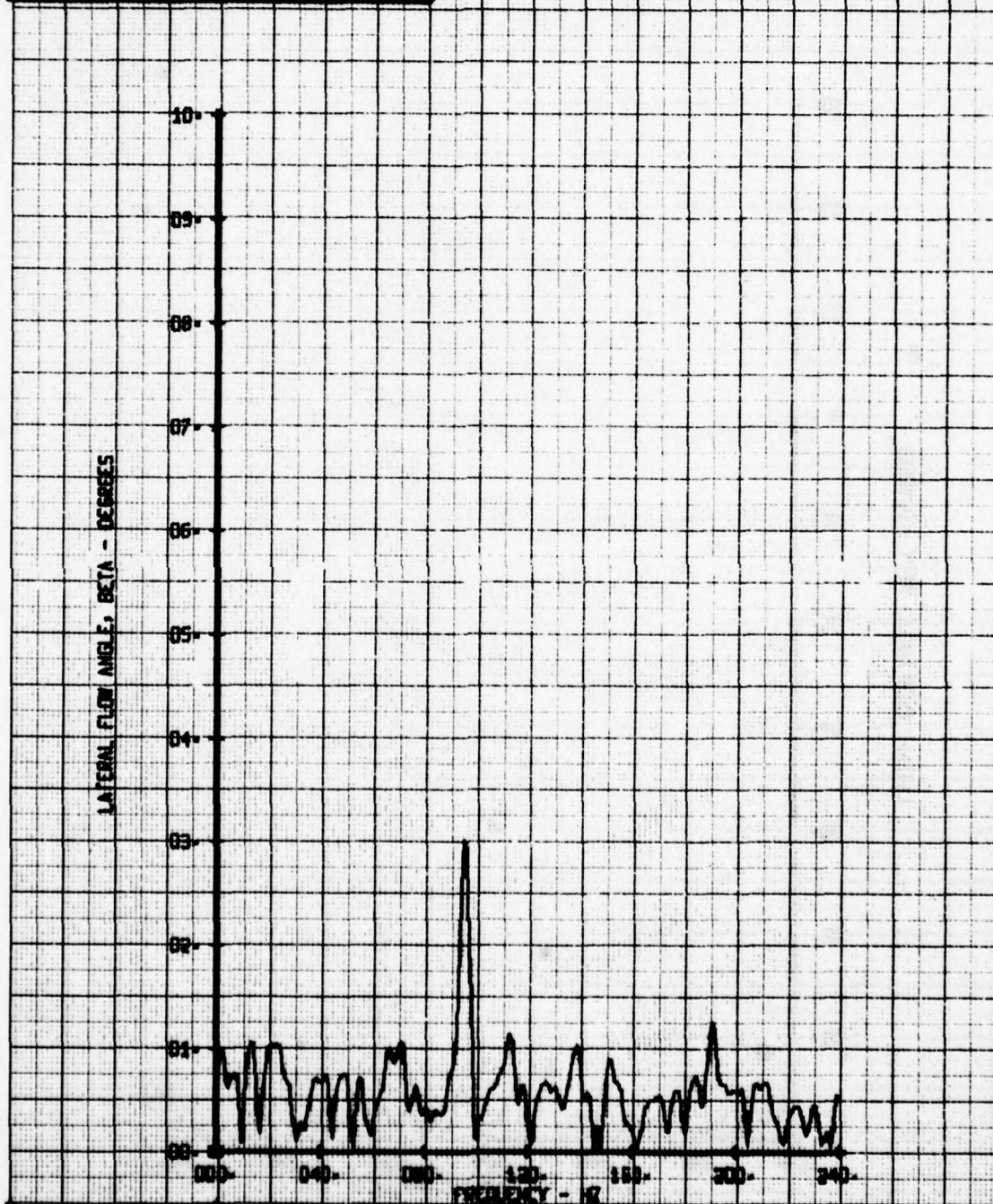
HOT FILM WAKE FREQUENCY ANALYSIS
 SOL CAP ARV CAN 7-80-2-4N-70-56
 RUN 208 TP 3

LEGEND
 CM
 PARAMETER
 BETA



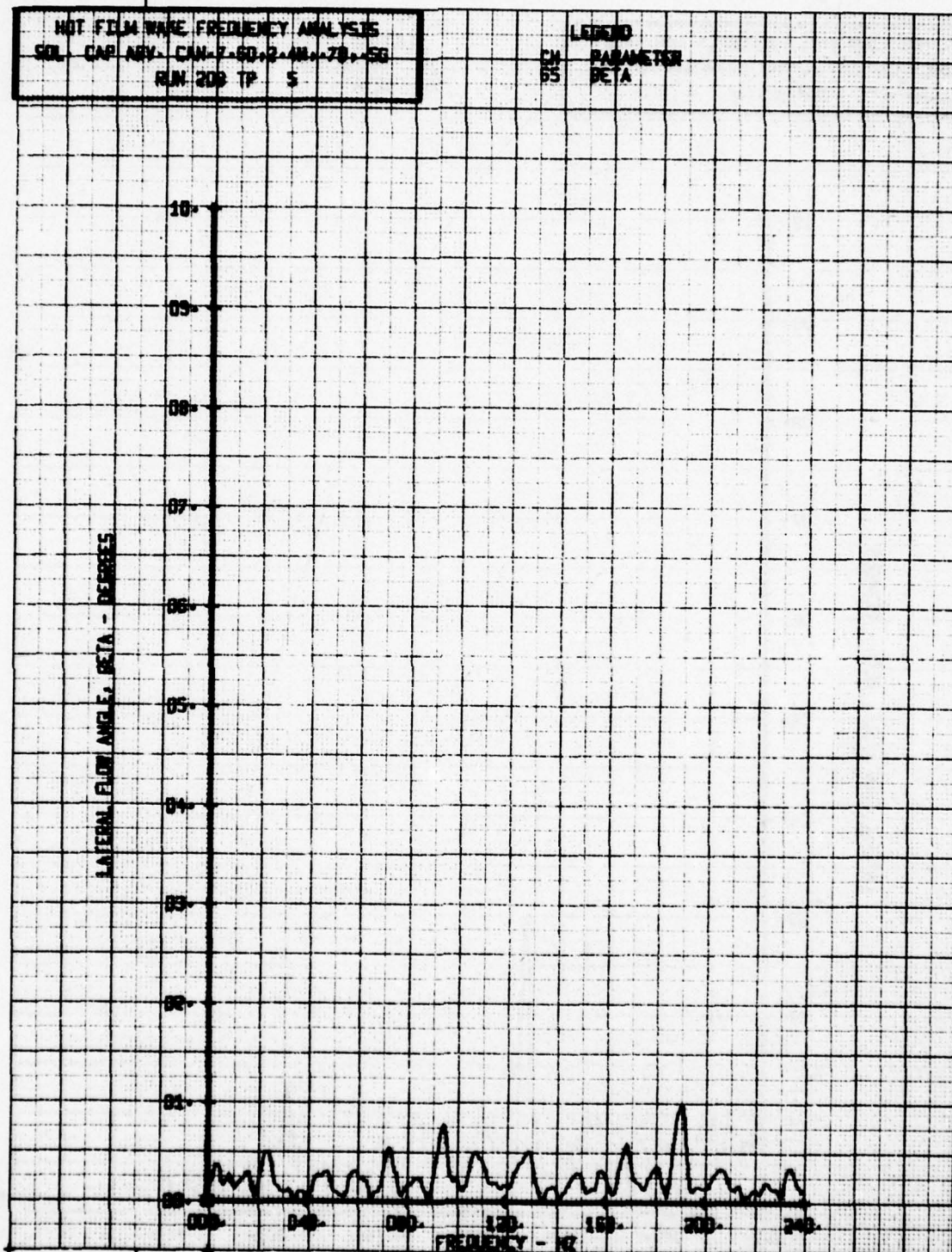
HOT FILM WARE FREQUENCY ANALYSIS
 SOL CAP ARY CAN 7-80-2-4N-7B-5B
 RUN 208 TP 4

LEGEND
 CH PARAMETER
 65 BETA



HOT FILM WARE FREQUENCY ANALYSIS
 SOL CAP ARV CAN-7-60-2-4M-70-50
 RUN 200 TP 5

LEGEND
 CH PARAMETER
 65 BETA



— 200 —

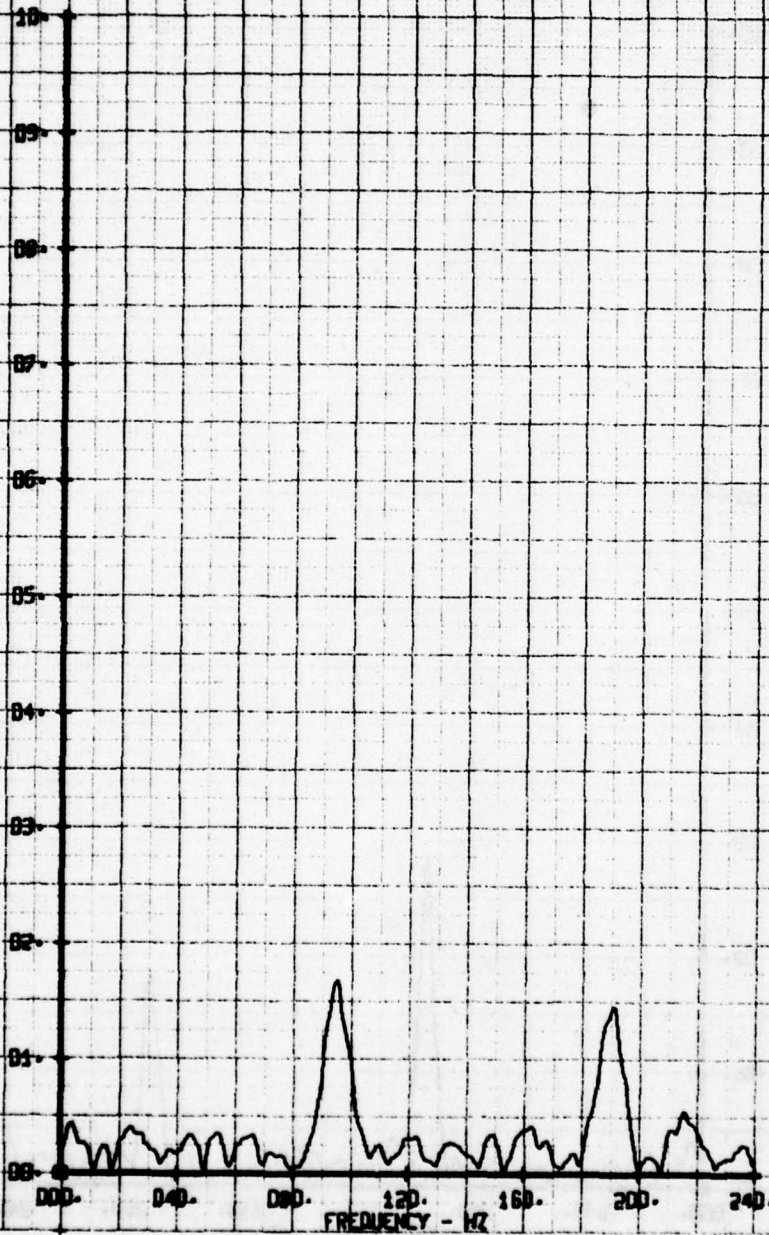
陳其南



NOT FILM WIRE FREQUENCY ANALYSIS
 SOL CAP ASV. CAN. 7.00.2.4M. 78.56
 RUN JOB TP 7

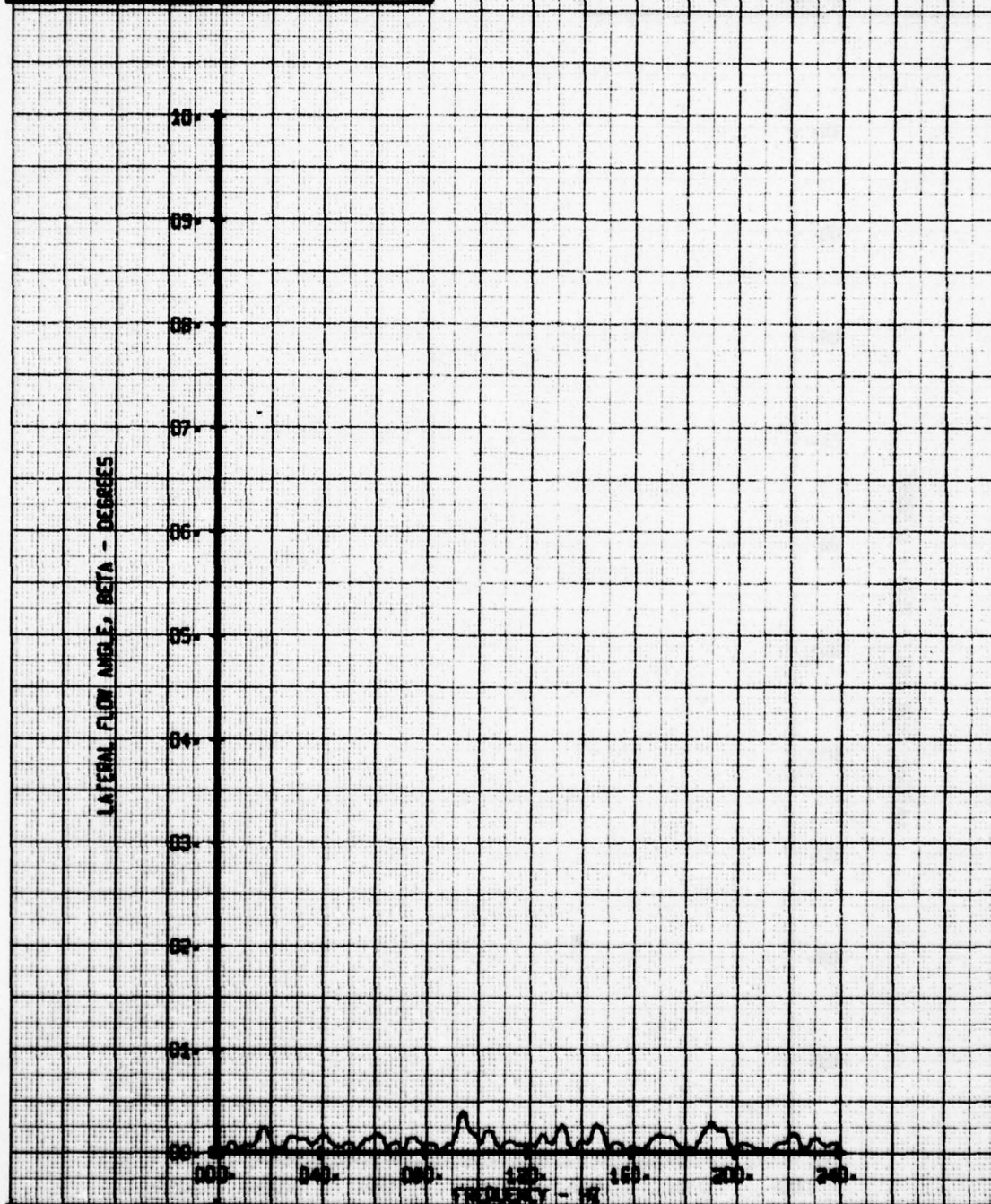
LEGEND
 CH PARAMETER
 B5 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



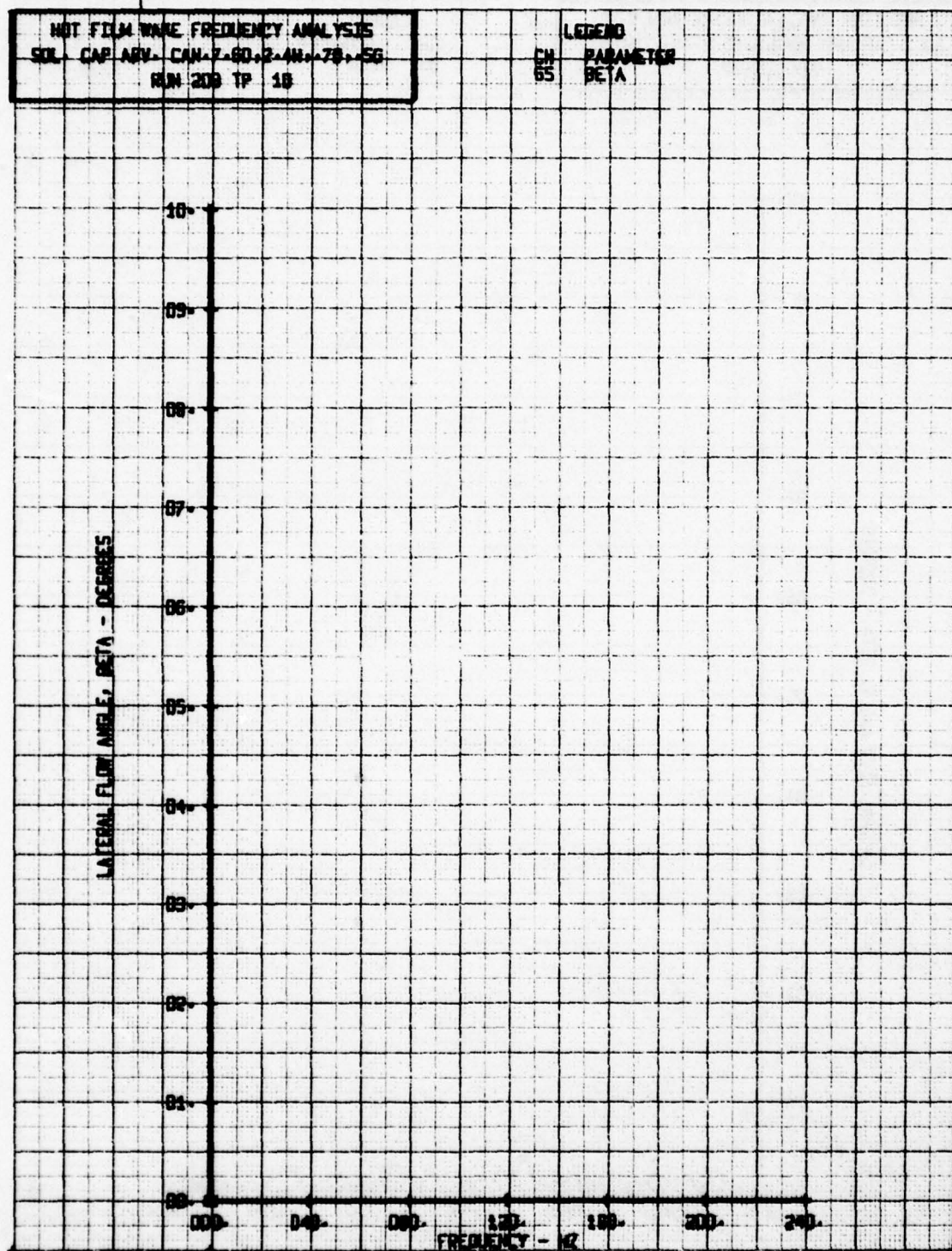
HIT FILM WAVE FREQUENCY ANALYSIS
 SOL CAP ARR CAN 7.60.2.4H.20.55
 RUN 208 TP 8

LEGEND
 CH PARAMETER
 65 BETA



NOT FILM WARE FREQUENCY ANALYSIS
SOL CAP ARV CAN 7.60 2.44 78.56
RUN 200 TP 18

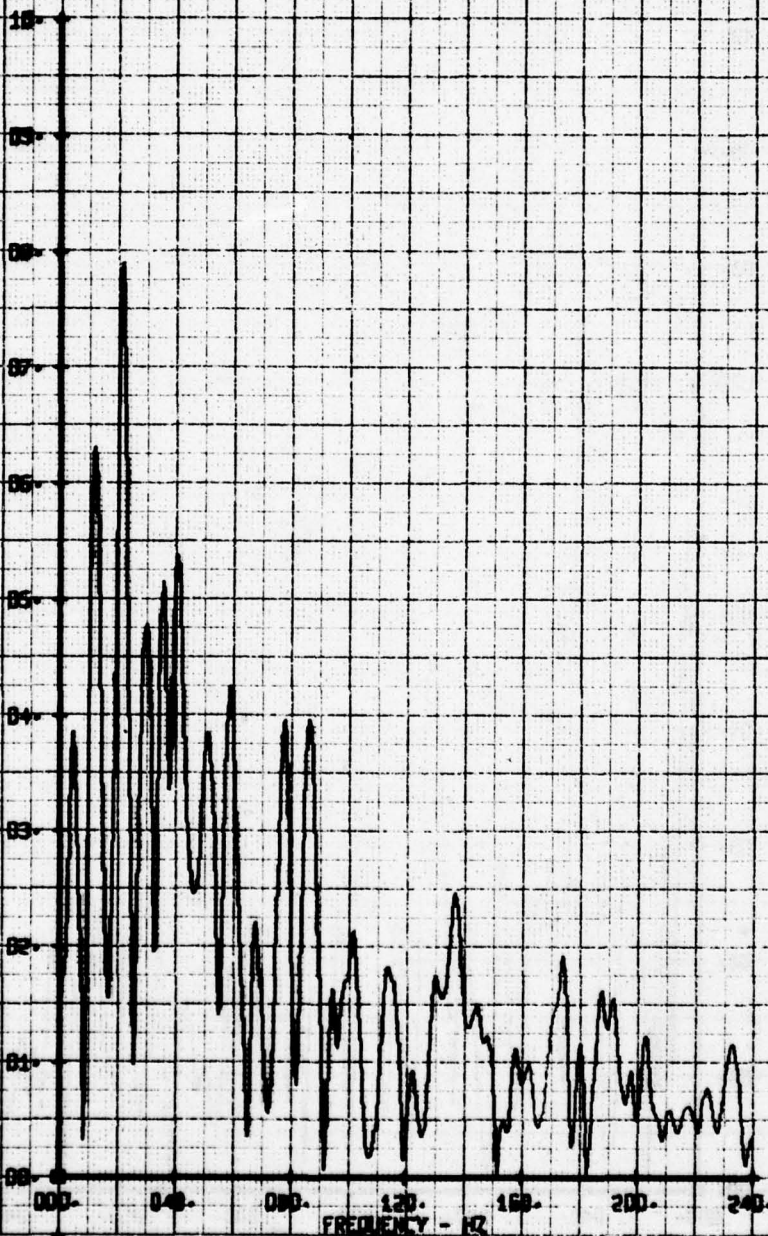
LEGEND
CH 65
PARAMETER
BETA



HOT FILM WIRE FREQUENCY ANALYSIS
SOL. CAP. AIR. CAR. 7-60-2-40-70-50
RUN 288 TP 2

LESEN
CH. 56
PARAMETER
Y-ALPHA

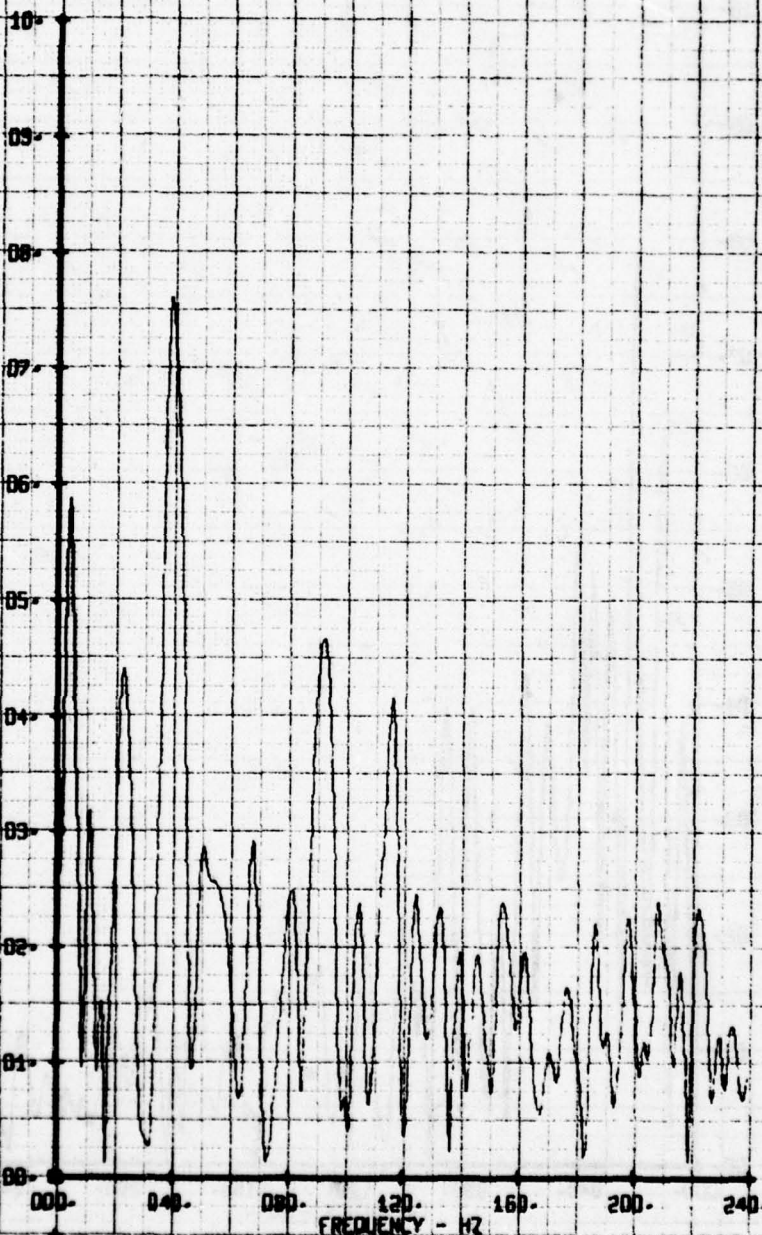
Y-ALPHA VELOCITY COMPONENT Y-ALPHA FPS

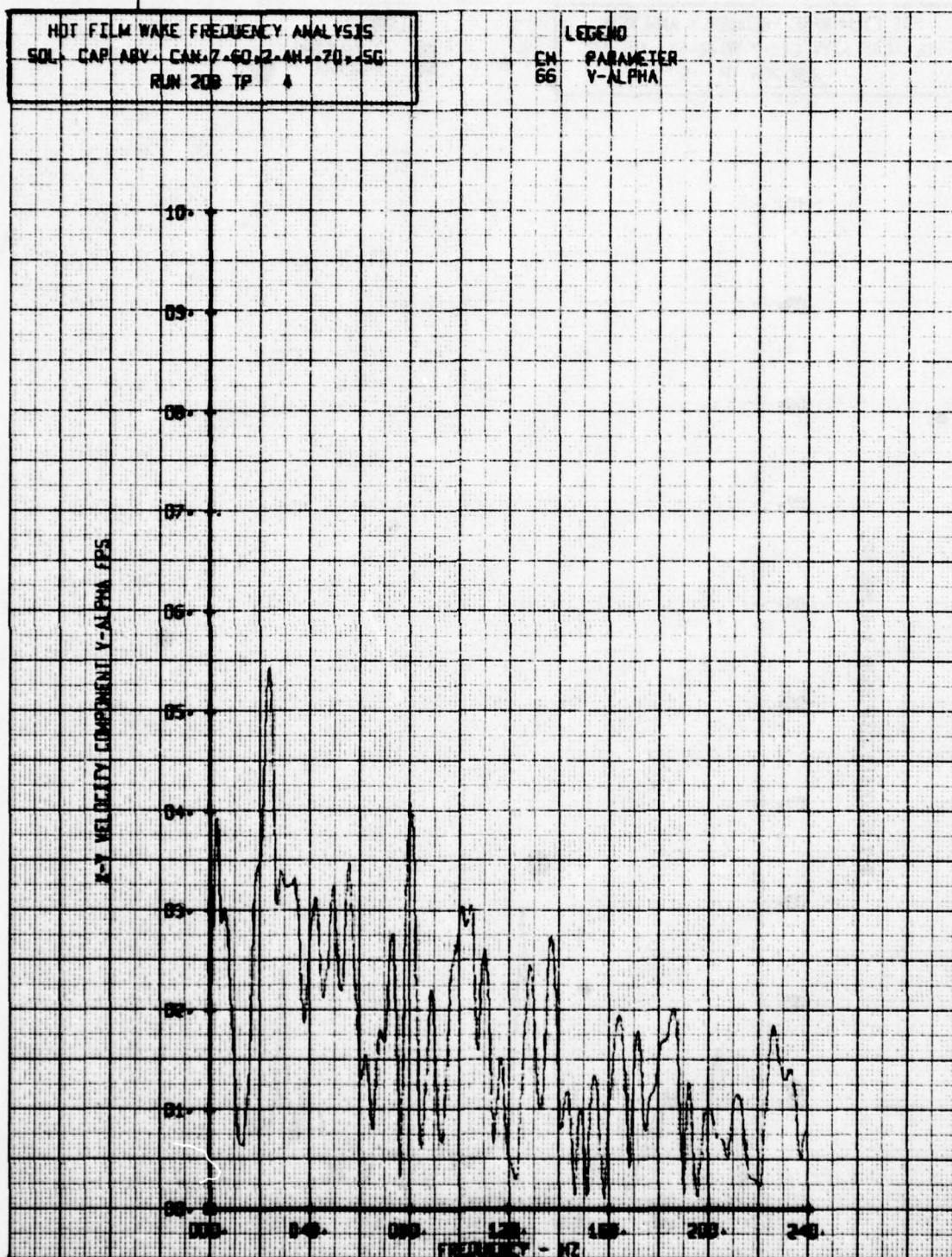


HOT FILM WAKE FREQUENCY ANALYSIS
SOL CAP ARV CAN 7-80-2-4H-78-56
RUN 208 TP 3

LEGEND
CH 66 PARAMETER
V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS

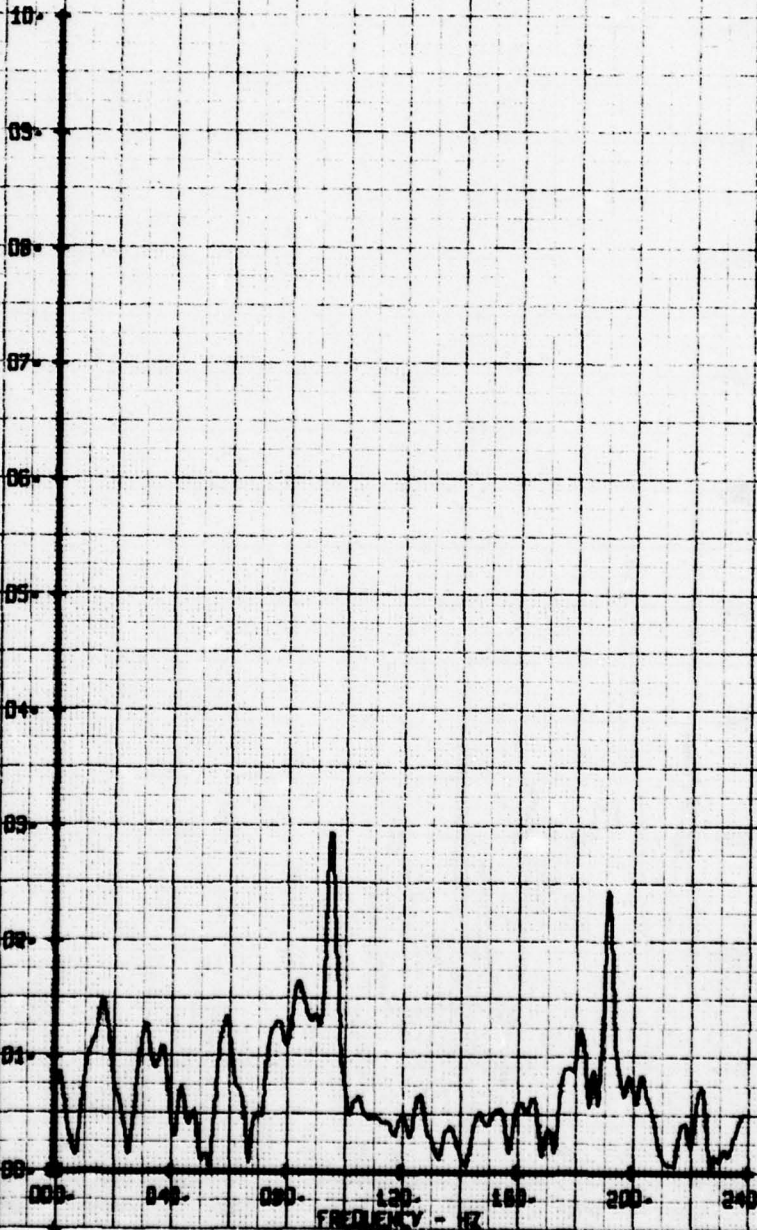




HOT FILM WAKE FREQUENCY ANALYSIS
SOL - CAP ARV - CAN 7-60-2-4N-78-5G
RUN 209 TP 5

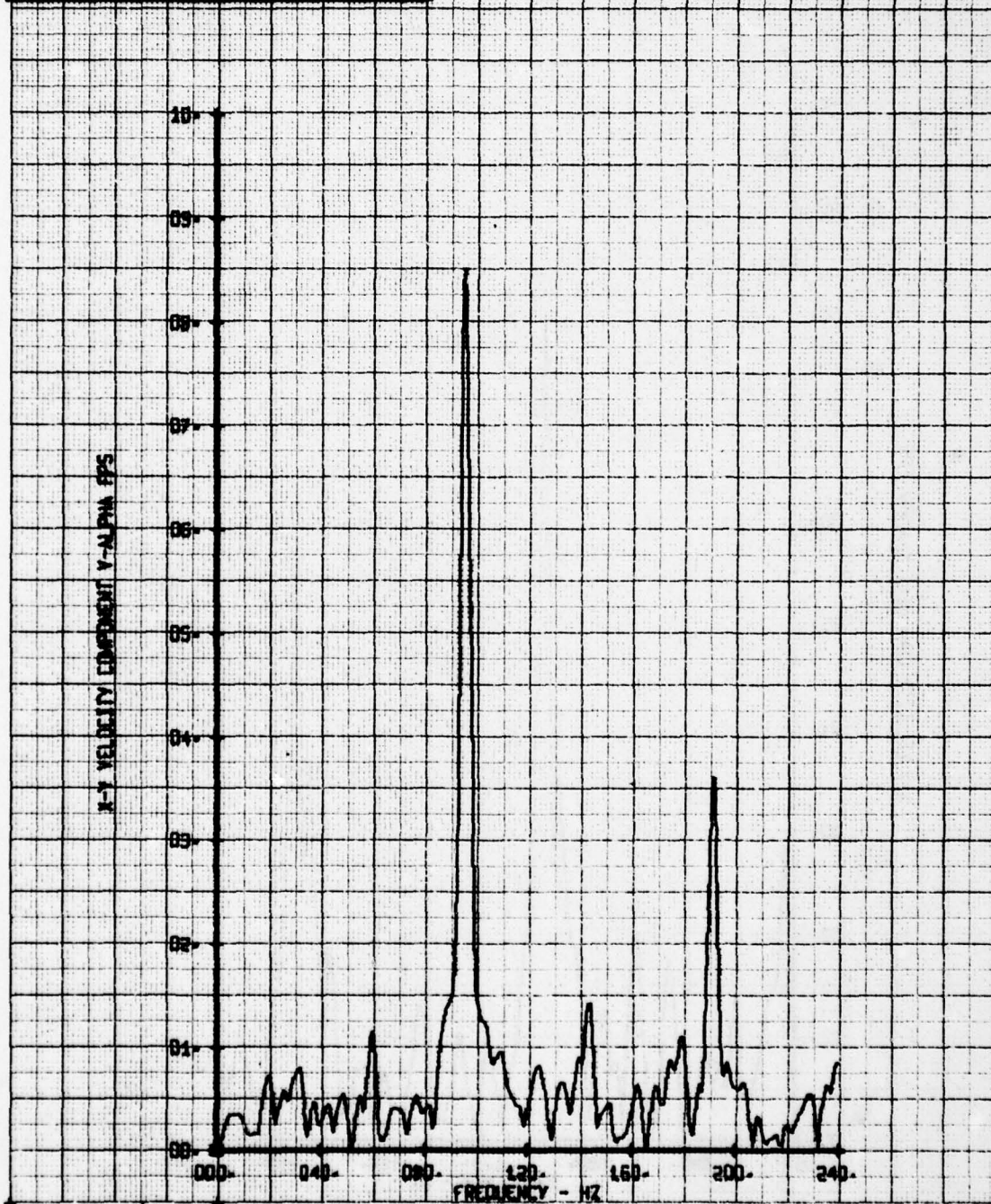
LEGEND
CH 66 PARAMETER
V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



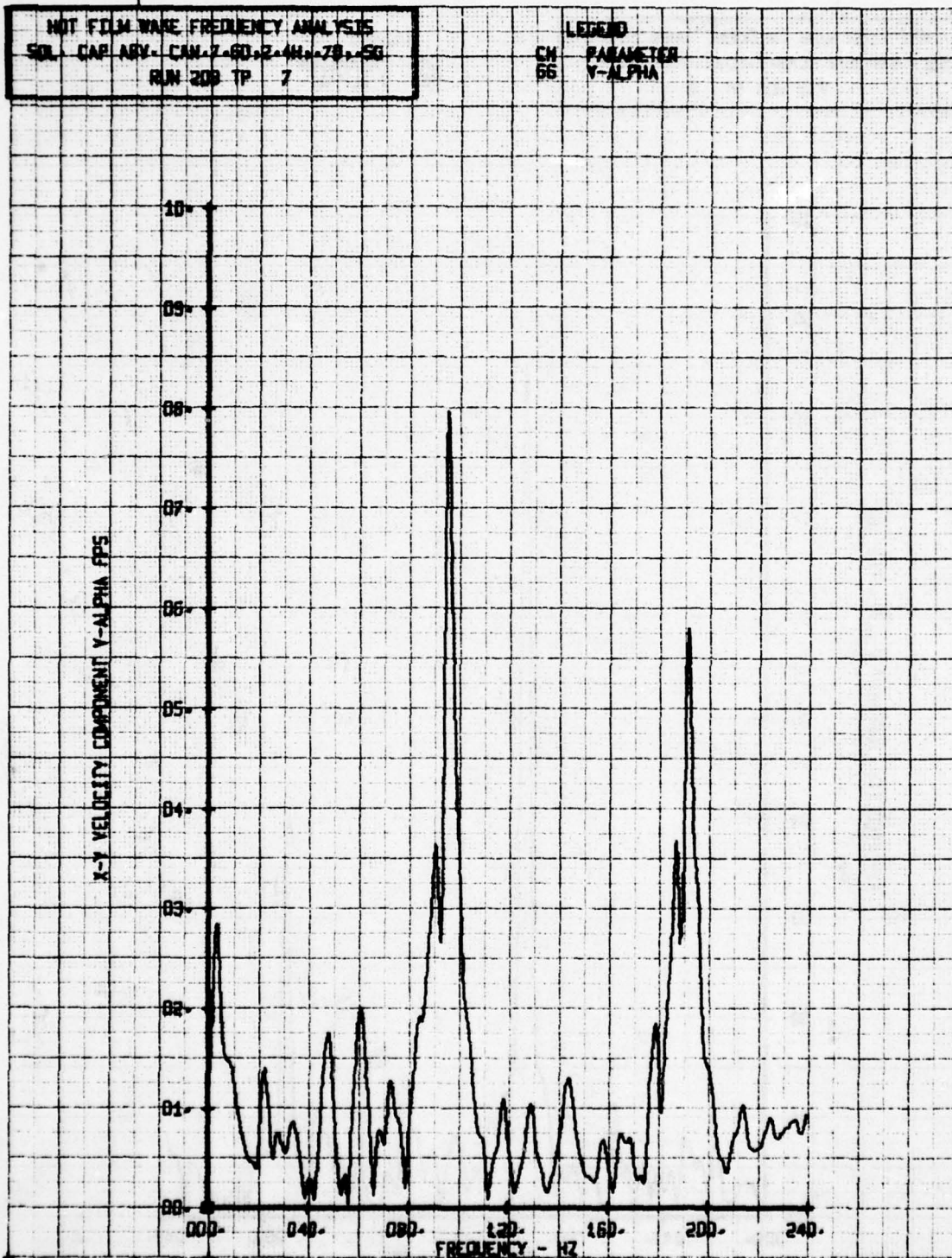
HOT FILM WIRE FREQUENCY ANALYSIS
 SOL. CAP. AIR. CAN. 7.60. 2.44. 79. 55
 RUN 209 TP 5

LEGEND
 CH. PARAMETER
 66 V-ALPHA



NOT FILM WARE FREQUENCY ANALYSIS
SOL CAP ARV CAN 7-60-2-44-78-56
RUN 208 TP 7

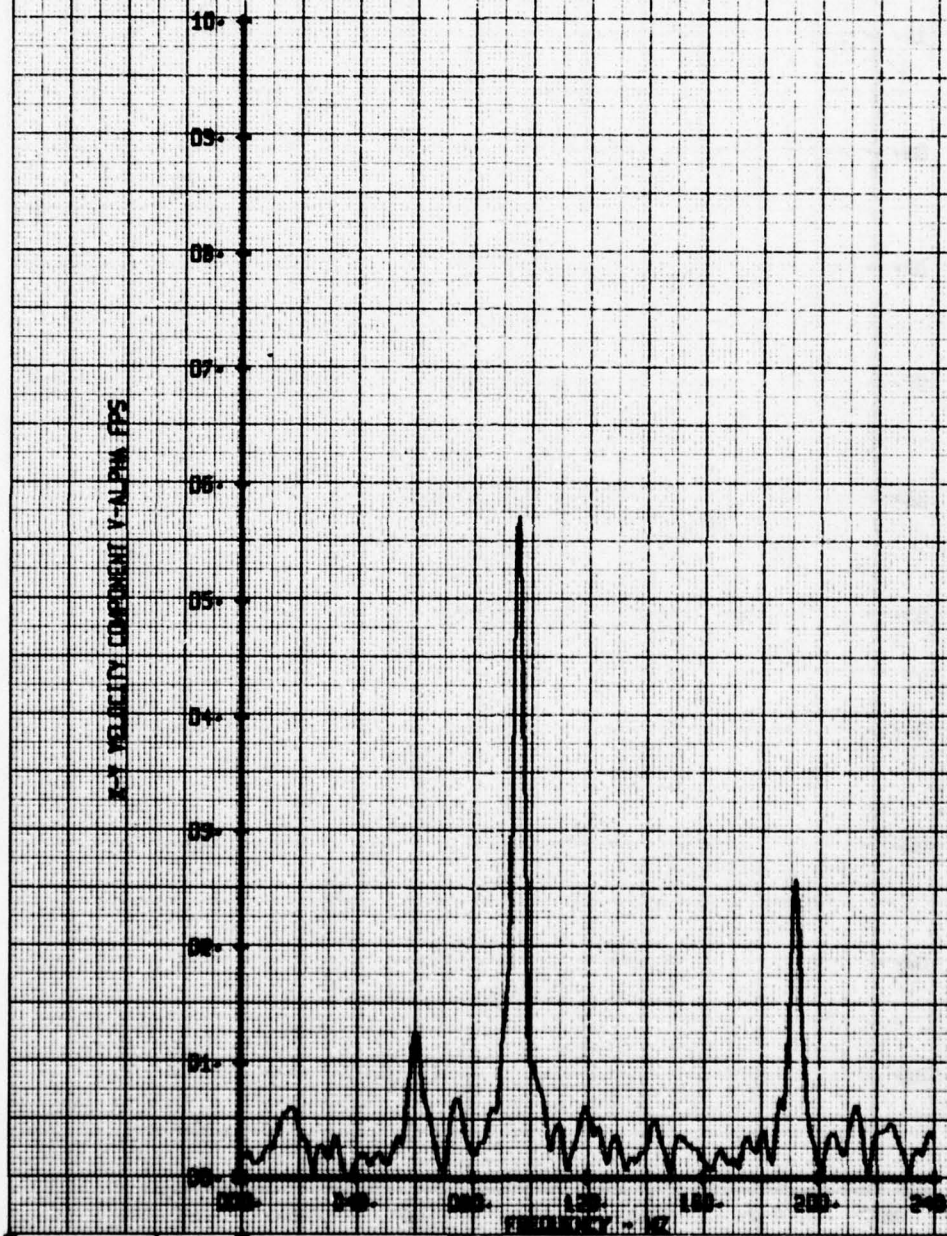
LEGEND
CH 66
PARAMETER
Y-ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
 SOL CAP ADV CAN 7-60-2-44-78-50
 RUN 208 TP 8

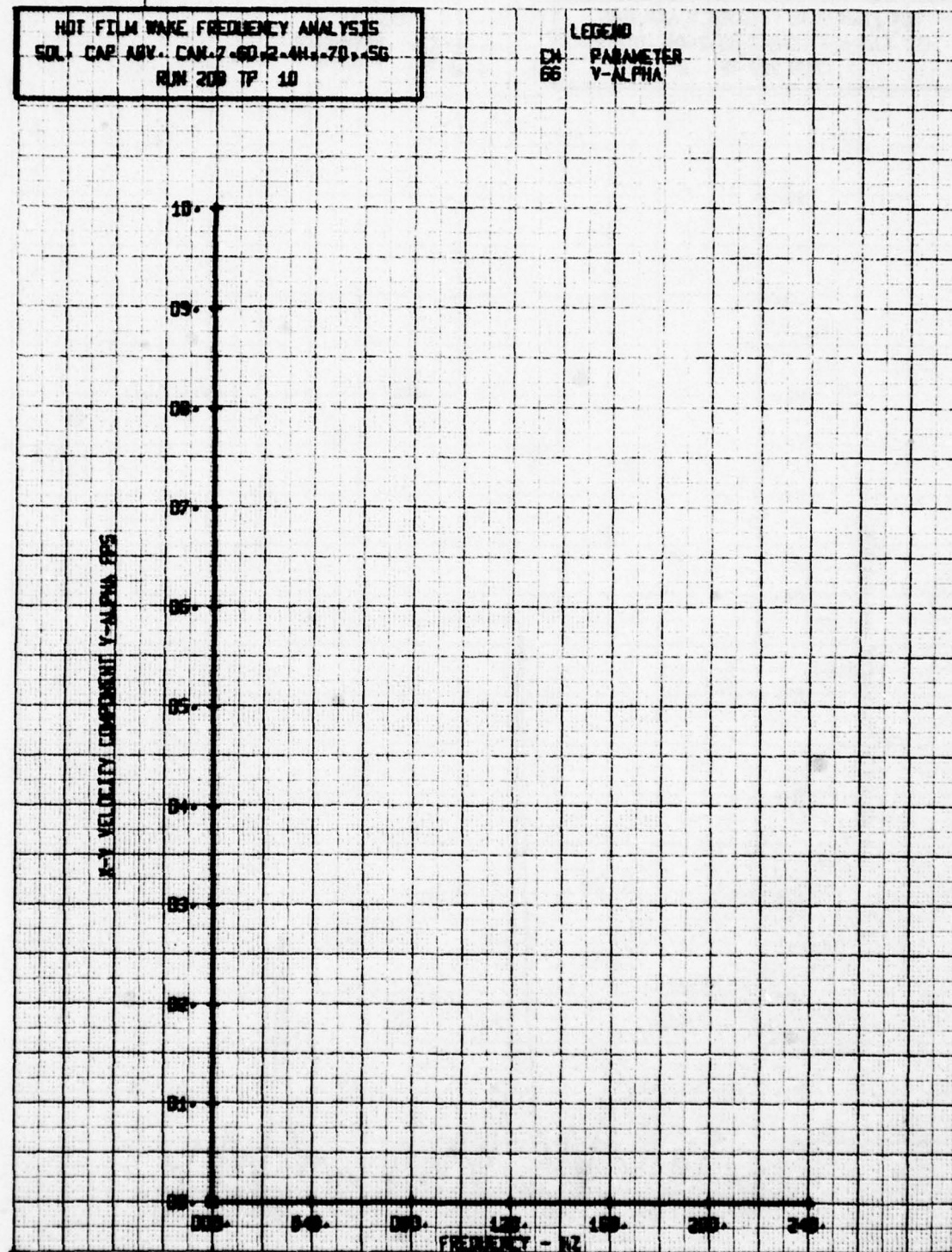
LEGEND
 CH PARAMETER
 55 Y-ALPHA

Y-ALPHA COMPONENT V-ALPHA FPS



HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ADV. CAN. 7-60-2-4H-70-SG
RUN 200 TP 10

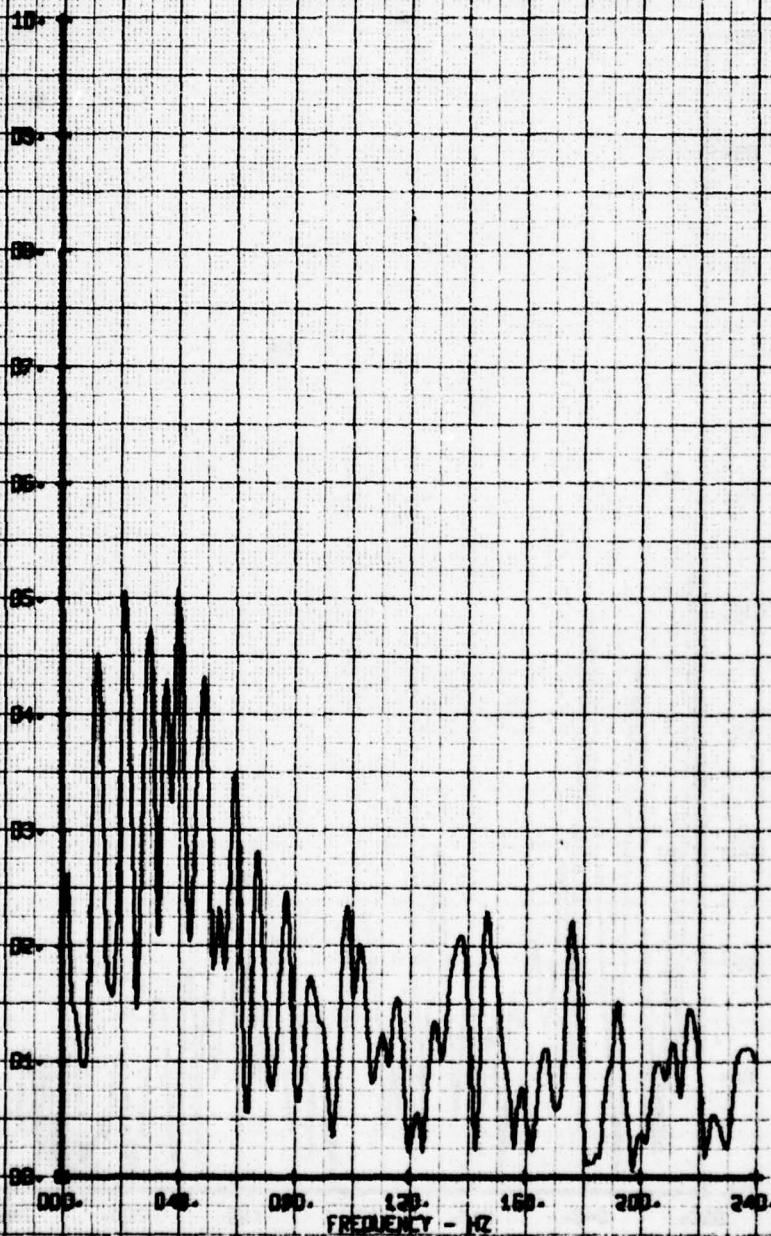
LEGEND
CH. 66
PARAMETER
V-ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
 SOL. CAP. ADV. CAN. 7.68.2-84.78.56
 RUN 200 TP 2

LEGEND
 CH PARAMETER
 BS Y-BETA

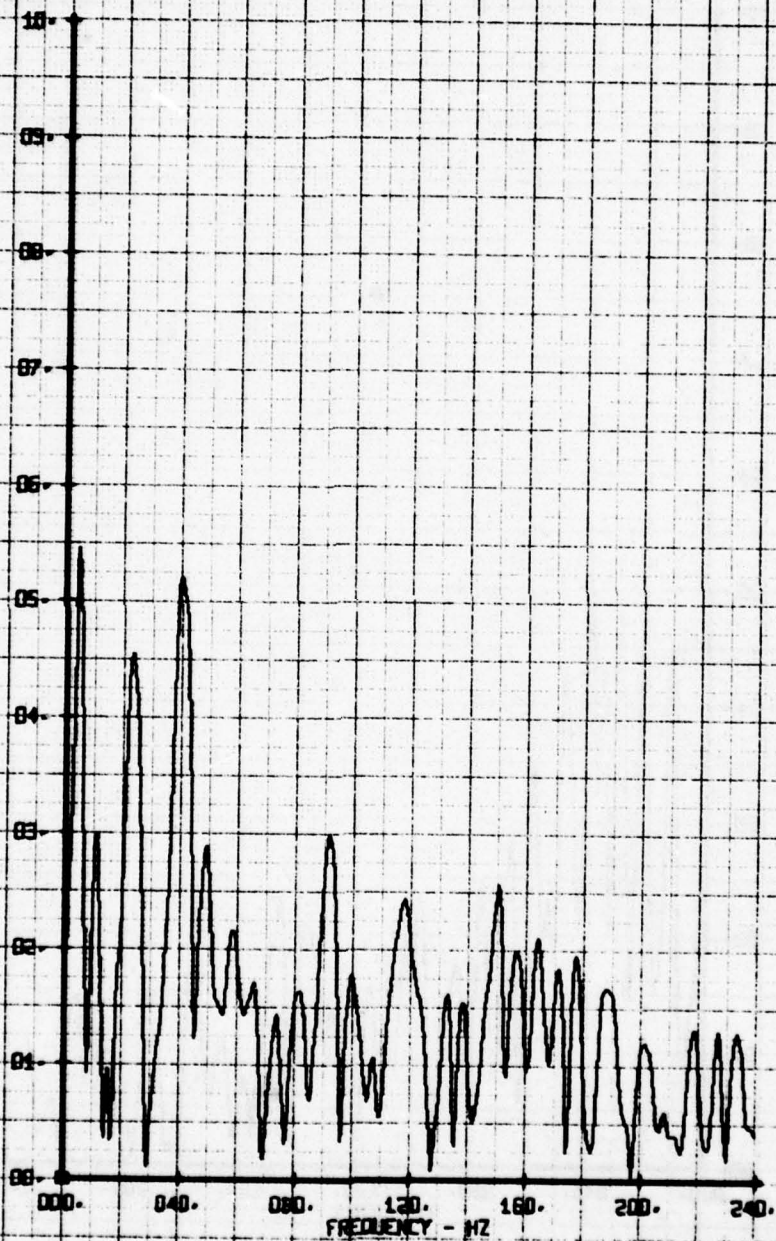
Y-BETA VELOCITY COEFFICIENT Y-BETA FFS



HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ARY. CAN. 7.60.2.4H.70.5G
RUN 208 TP 3

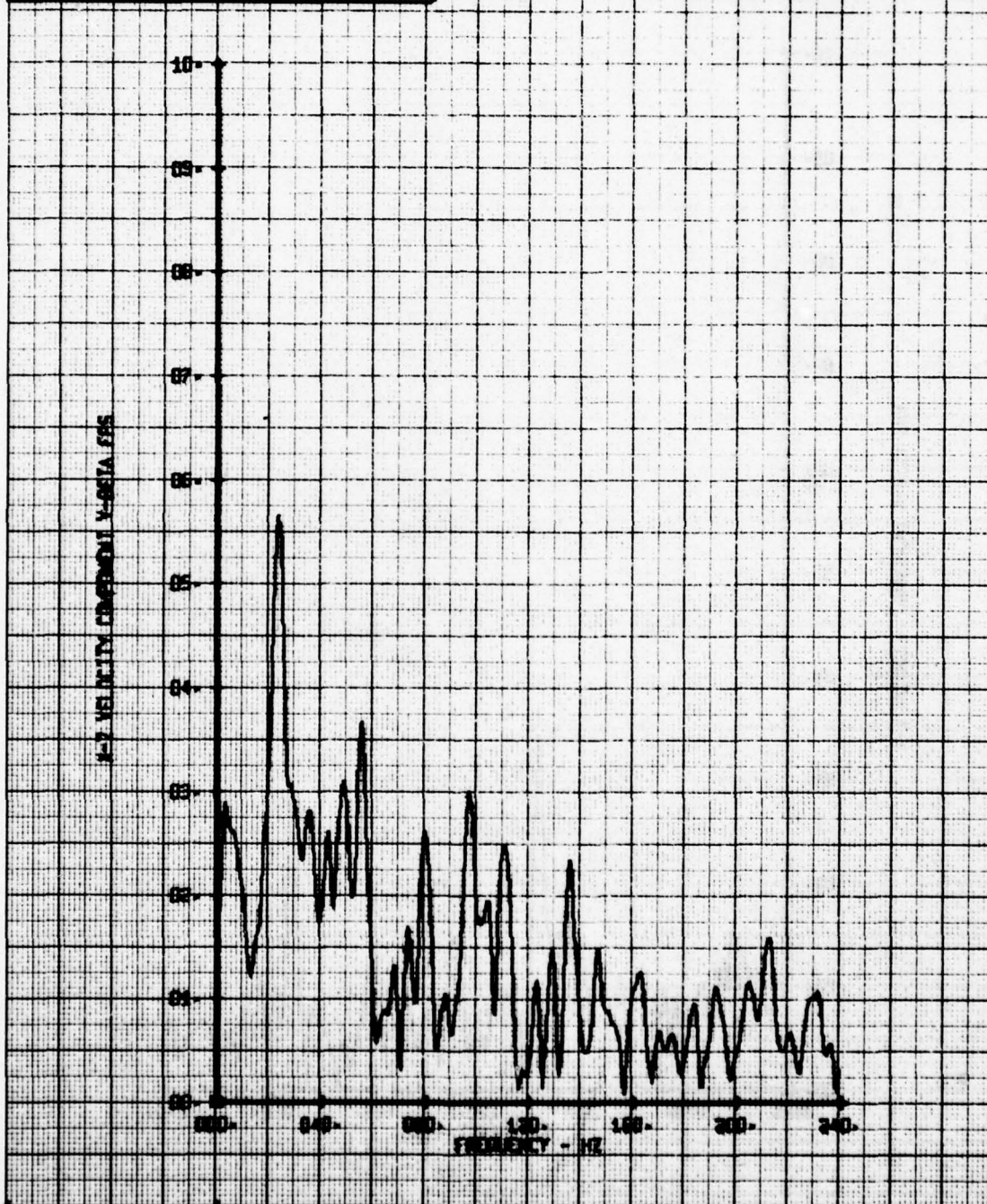
LEGEND
CH PARAMETER
65 V-BETA

X-2 VELOCITY COMPONENT V-BETA FBS



HOT FILM WIRE FREQUENCY ANALYSIS
 SOL. CAP. ARY. CAN. 7.60-2.4H. 70.5SG
 RUN 208 TP 4

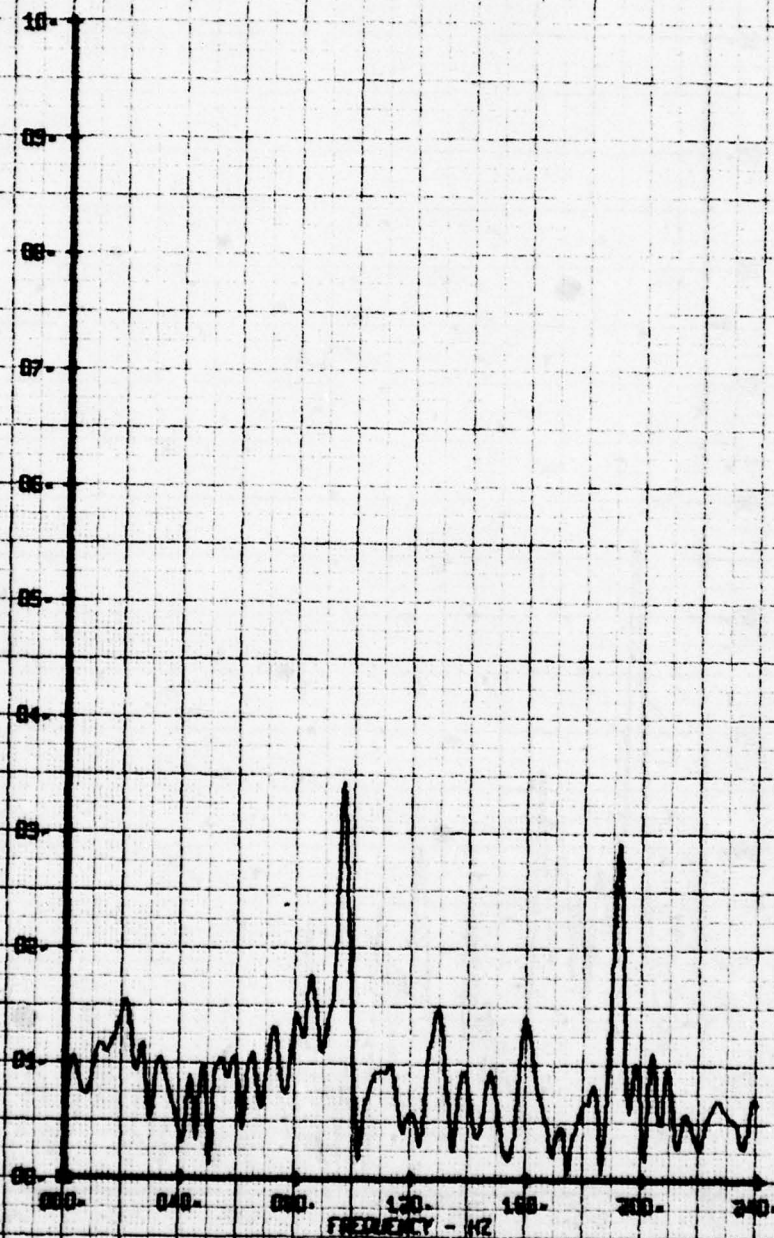
LEGEND
 CH. PARAMETER
 65 V-BETA

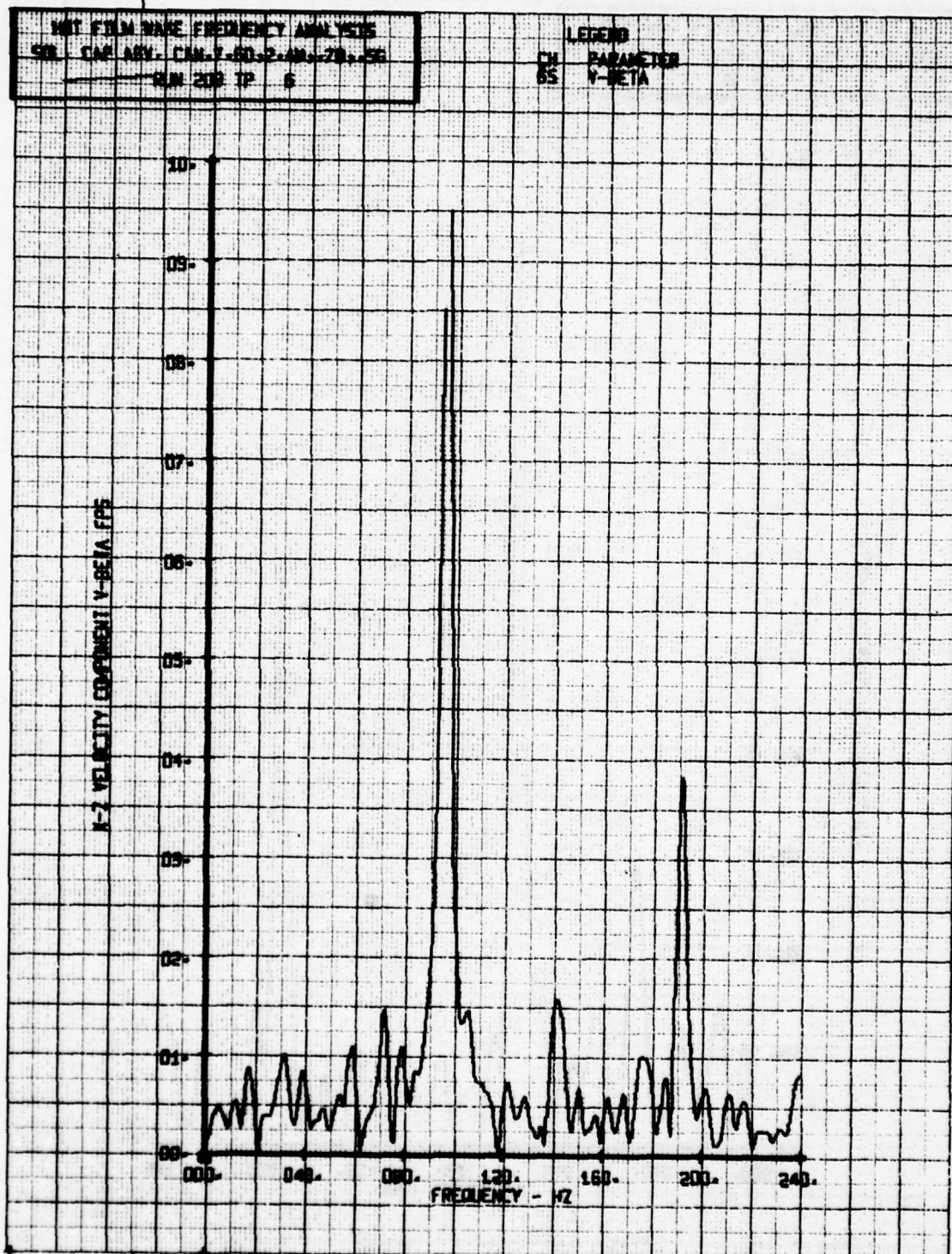


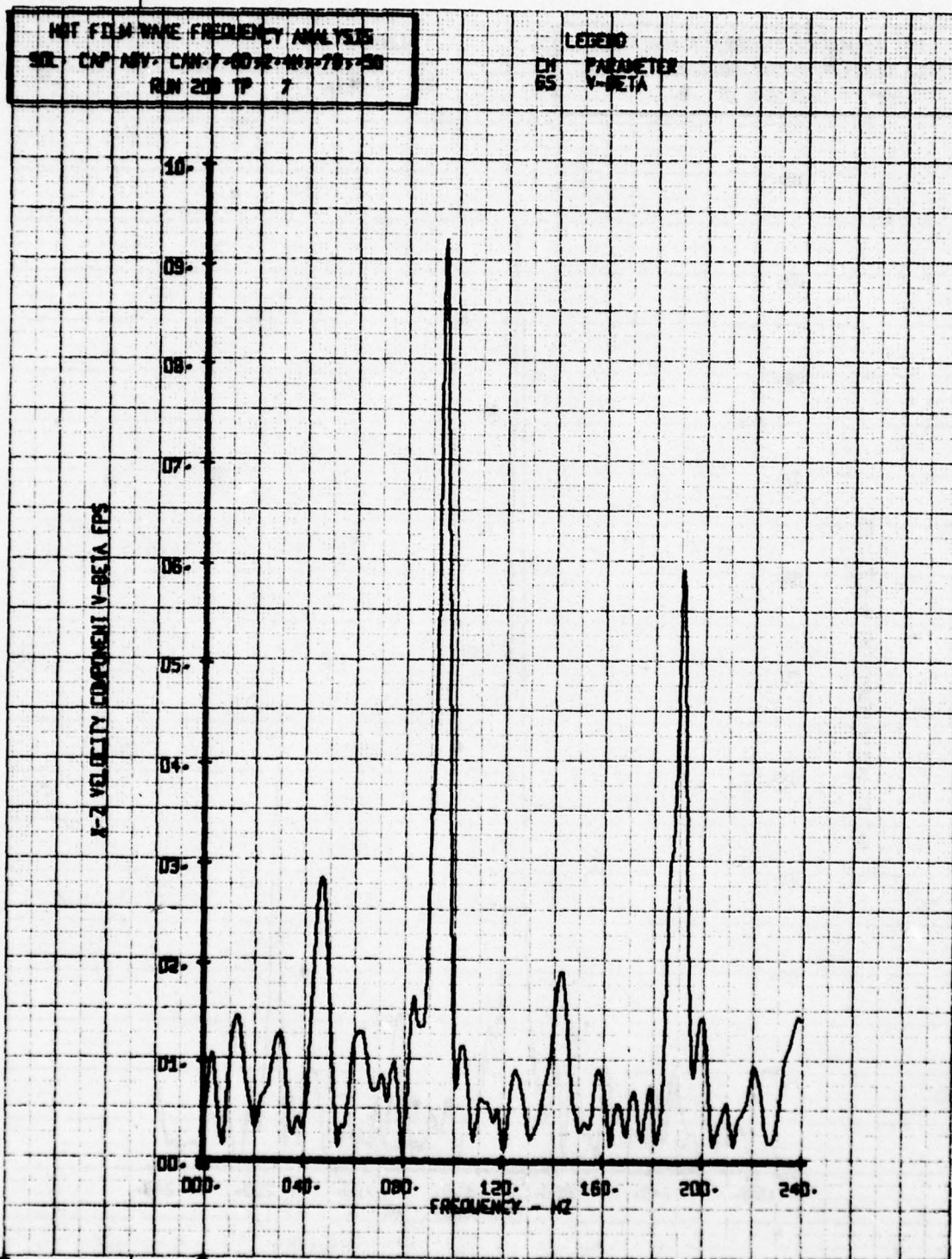
HOT FILM WIRE FREQUENCY ANALYSIS
SOL. CAP. ARY. CAN. 7-60.2-4H. 7D. 5G
RUN 200 TP 5

LEGEND
CH1 PARAMETER
CH2 V-BETA

X-Y VELOCITY COMPONENT V-BETA CHS

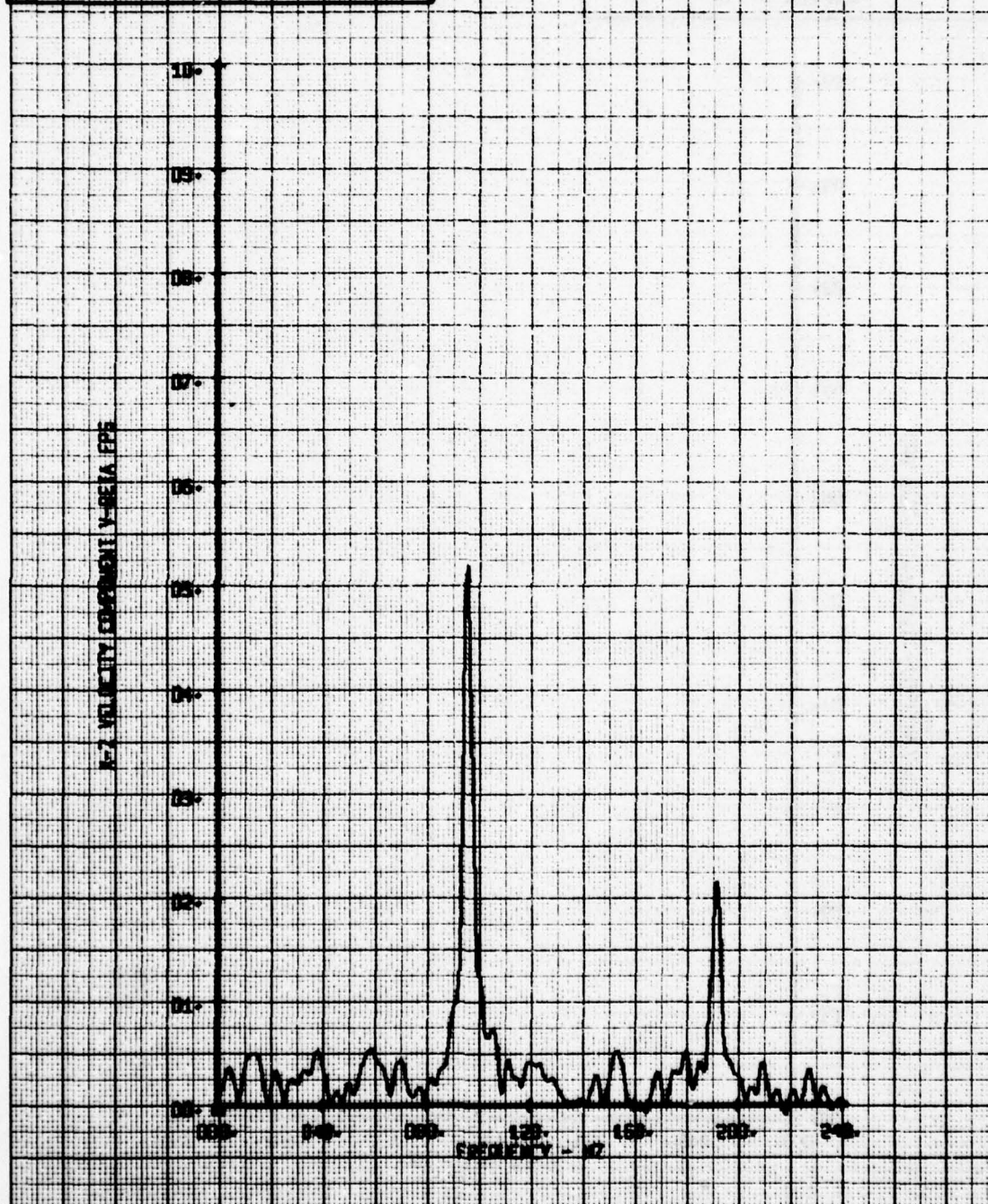






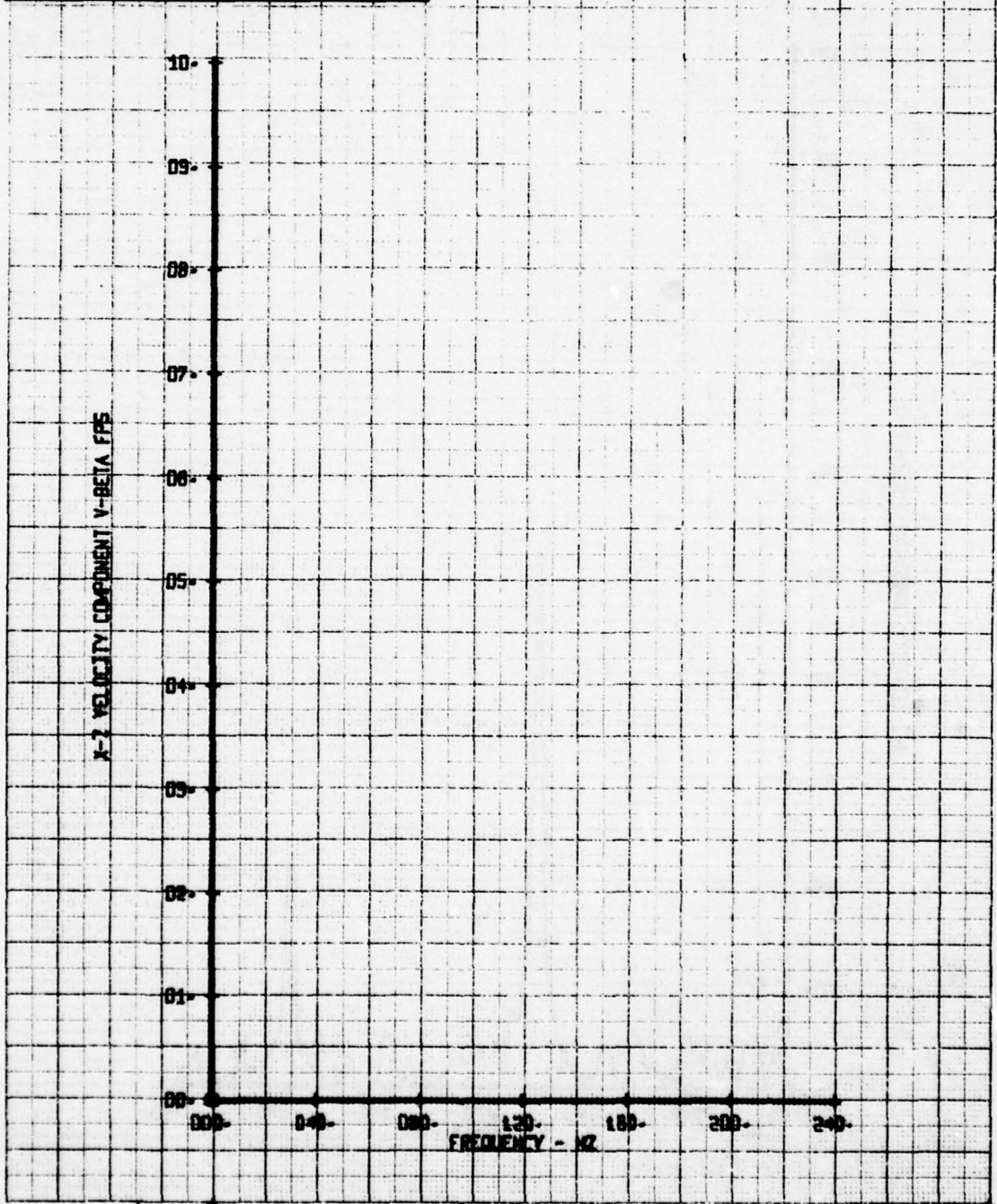
HOT FILM WAKE FREQUENCY ANALYSIS
 SOL CAP ADV CAN-7-60-2-M-70-56
 RUN 200 TP 0

LEGEND
 CH PARAMETER
 65 V-BETA



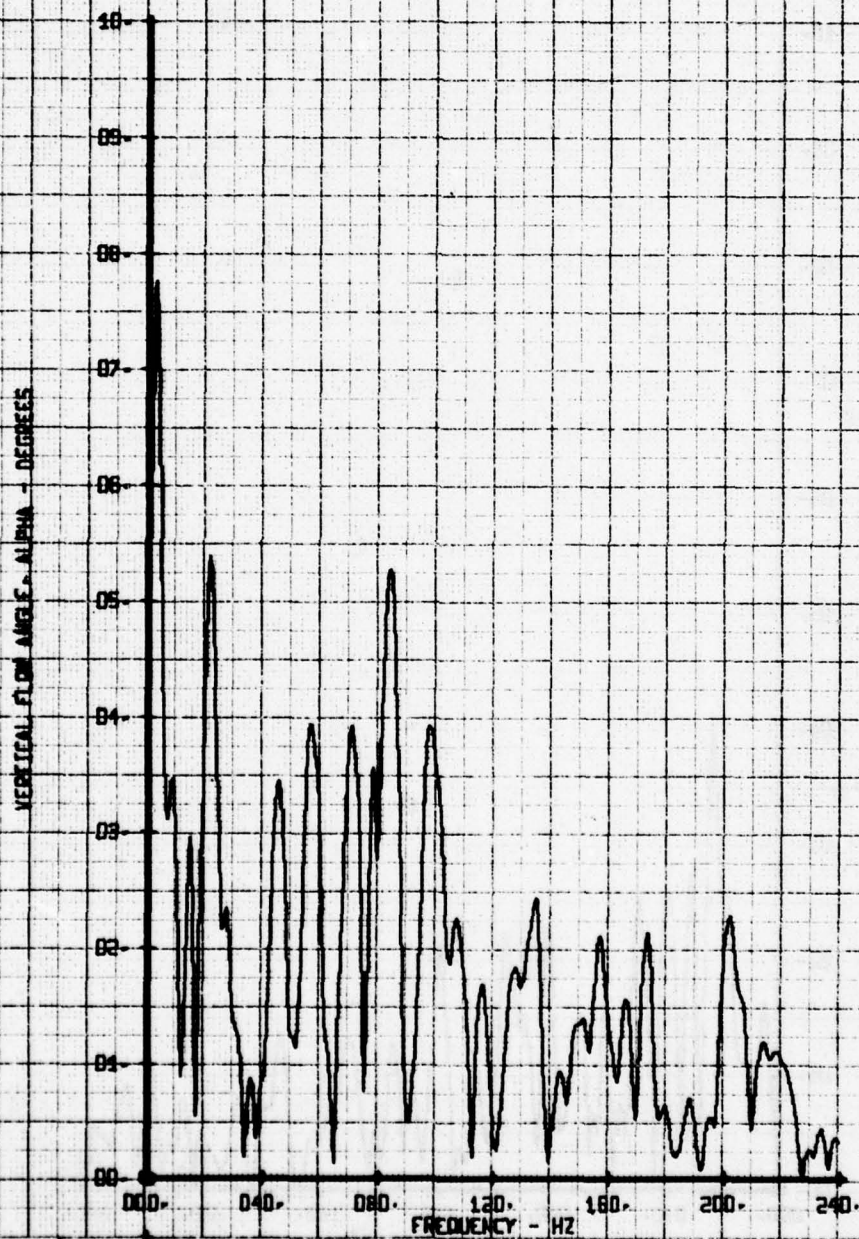
HOT FILM WAKE FREQUENCY ANALYSIS
 SOL- CAP ARY- CAN-7-60,2-4H,7B,5G
 RUN 200 TP 10

LEGEND
 CH 65
 PARAMETER
 V-BETA



HOT FILM WAKE FREQUENCY ANALYSIS
ST1 CAP ARY. CAN 100-3-25H-1-55D-5G
RUN 189 1P 29

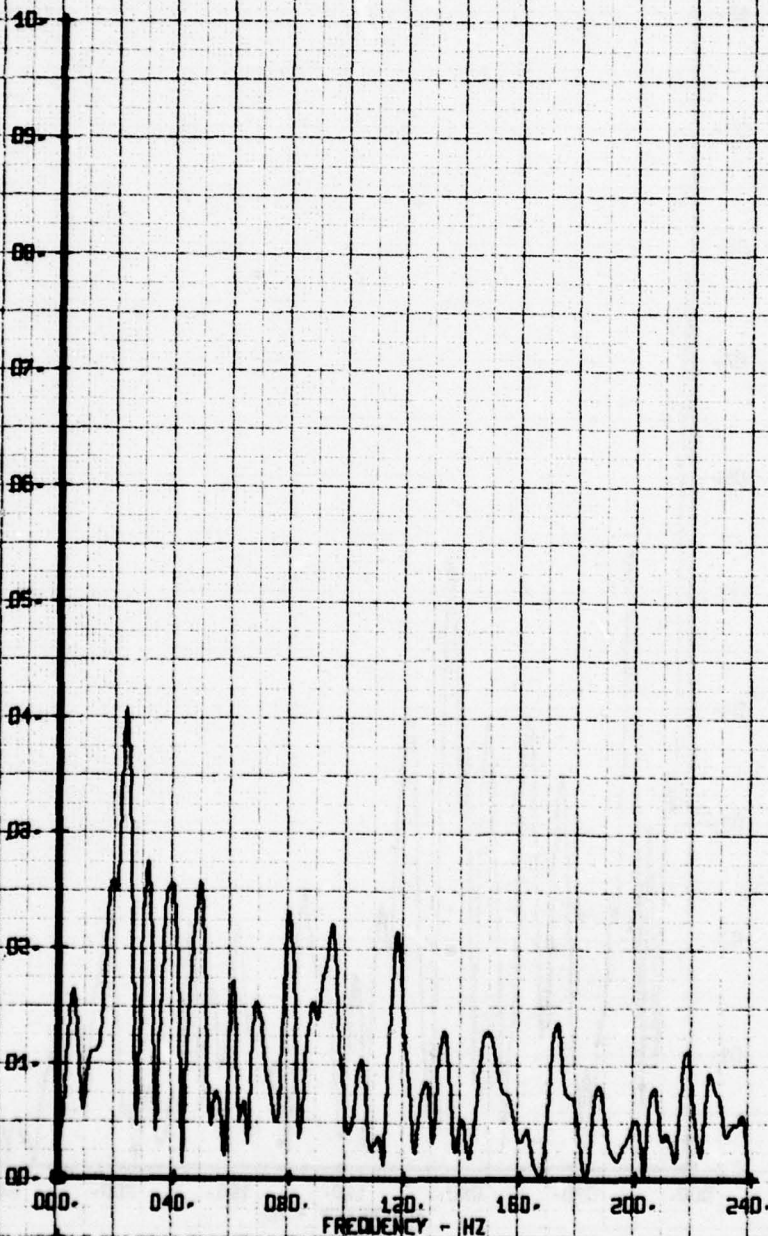
LEGEND
CH PARAMETER
86 ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
STL CAP ARY. CAN 100.3.254.1.550.56
RUN 189 TP 30

LEGEND
CH 66
PARAMETER
ALPHA

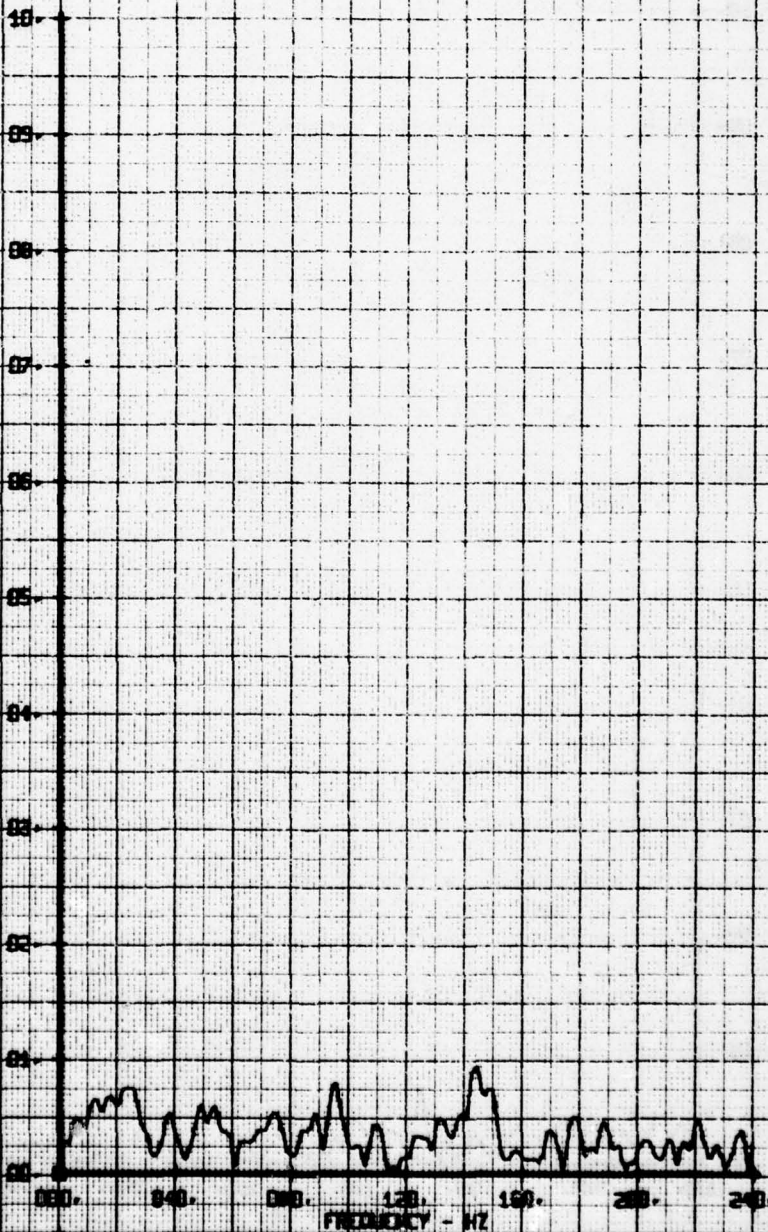
VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WAKE FREQUENCY ANALYSIS
SOI-CAP ARY. CAN 100.3-25H.1-550.5G
RUN 109 TP 31

LEGEND
CH 66
PARAMETER
ALPHA

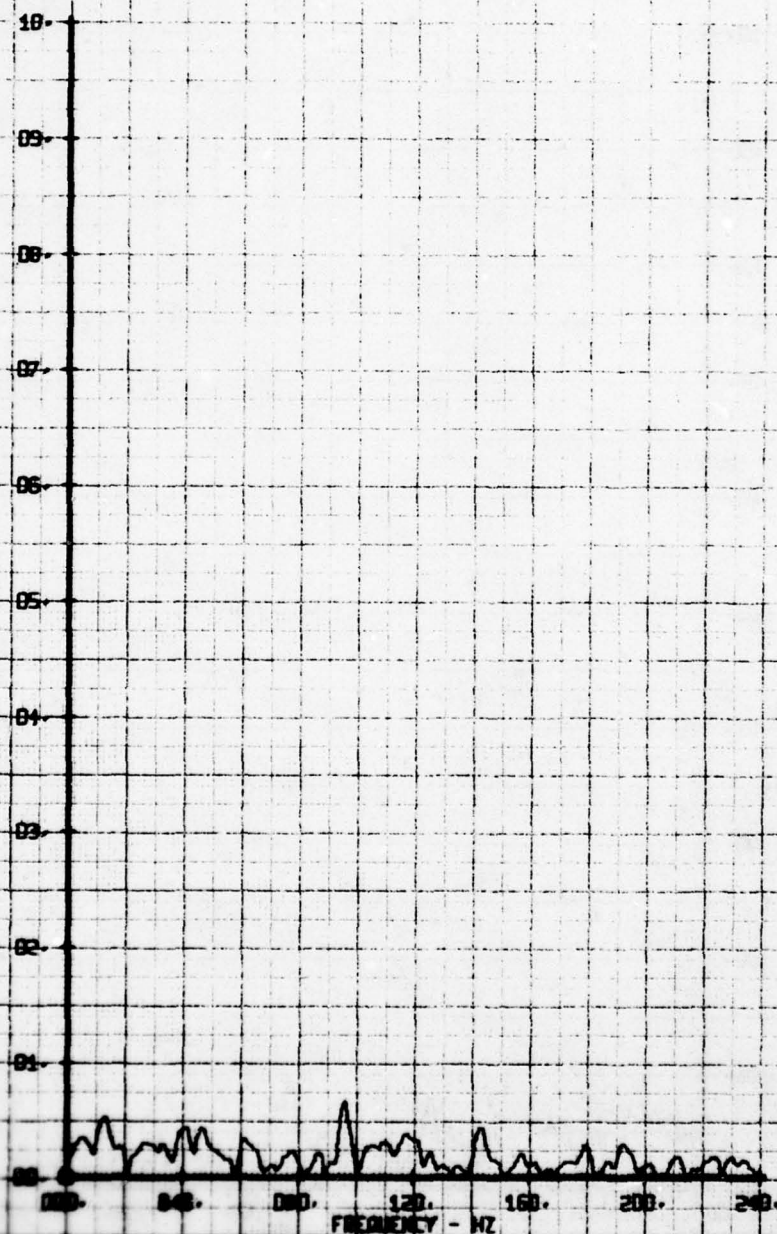
VERTICAL FLOW ANGLE, ALPHA - DEGREES

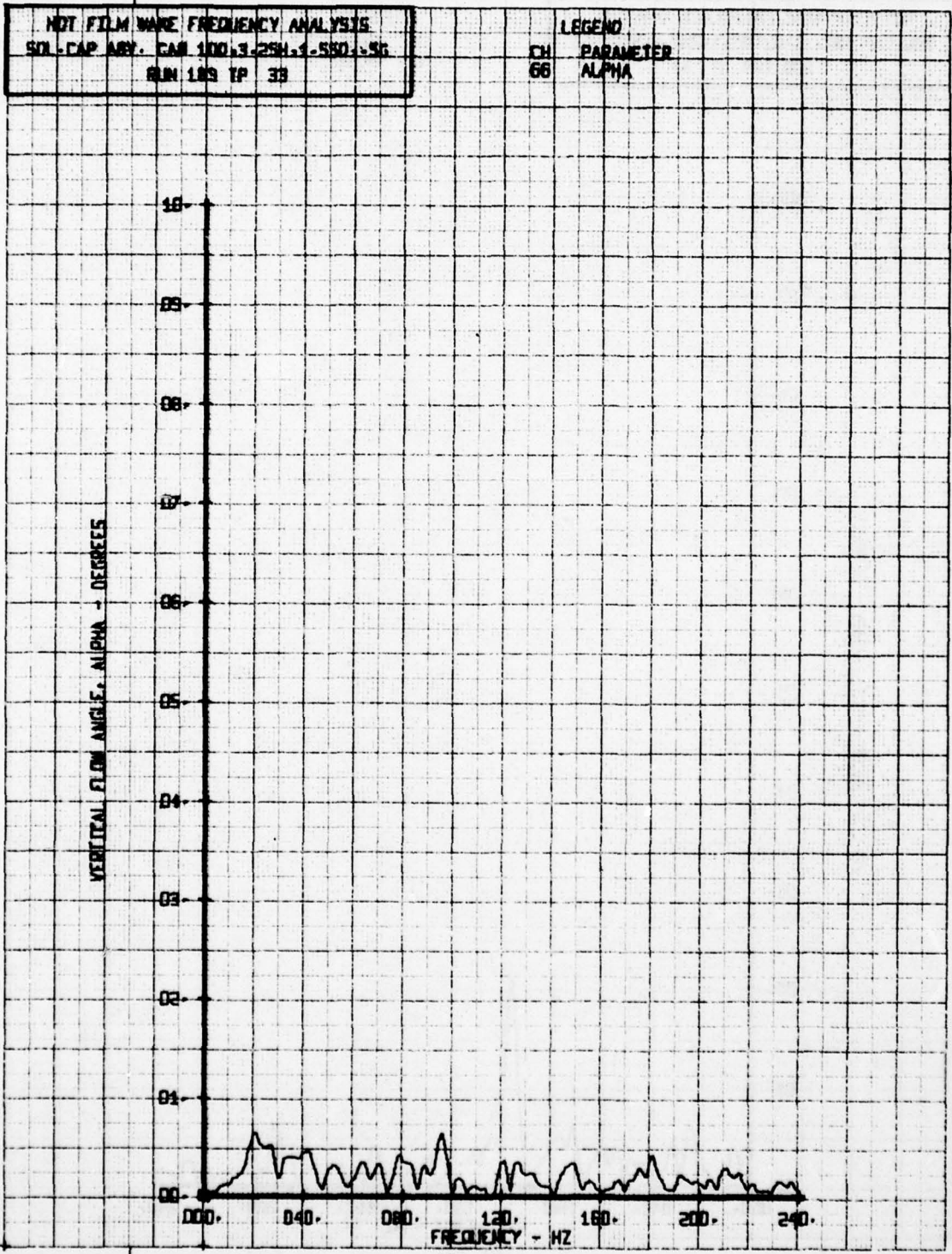


HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ABY. CAM. 100.3.25H.1.550.5G
RUN 189 TP 32

LEGEND
CH 66 PARAMETER
ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

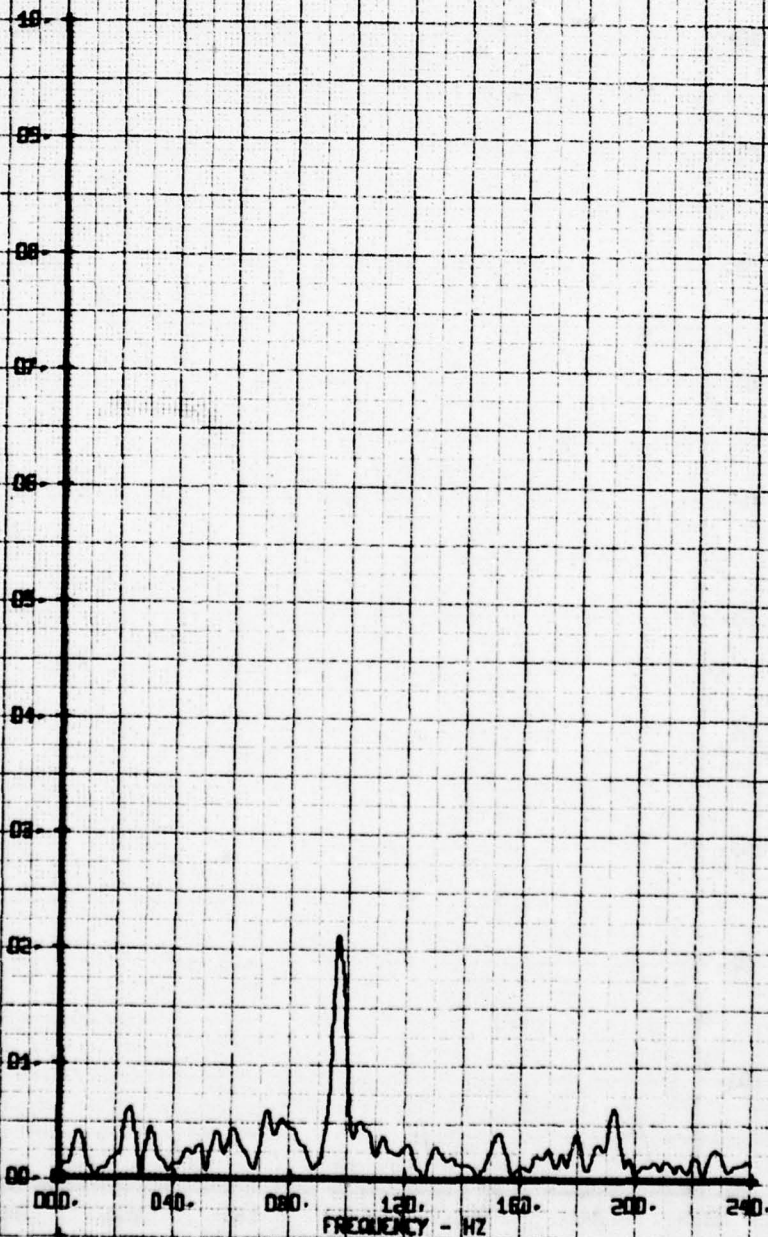




NOT FILM WARE FREQUENCY ANALYSIS
SOL-CAP ARY. FAN 100.3-254.1-550.56
RUM 189 YP 34

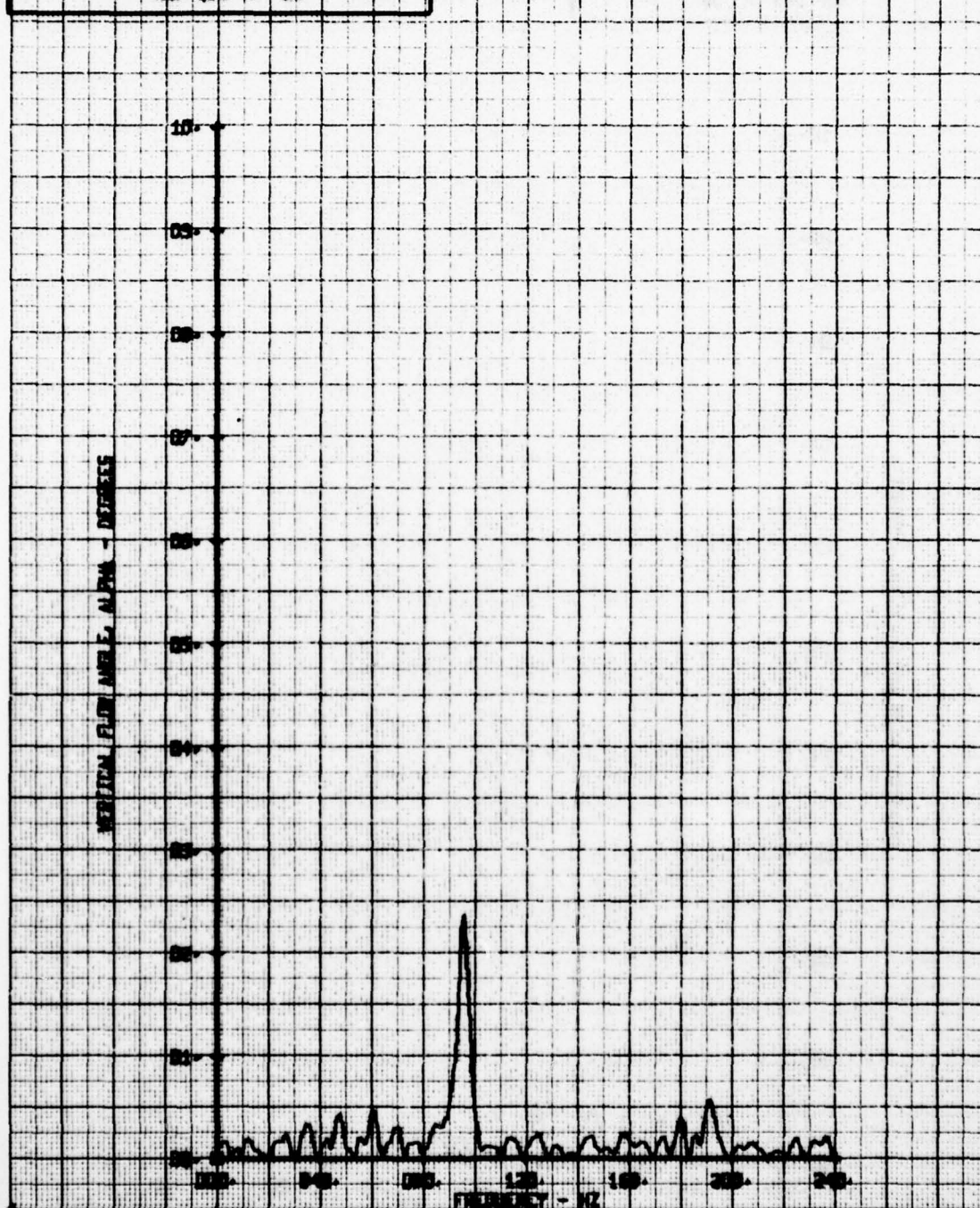
LEGEND
CH PARAMETER
56 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



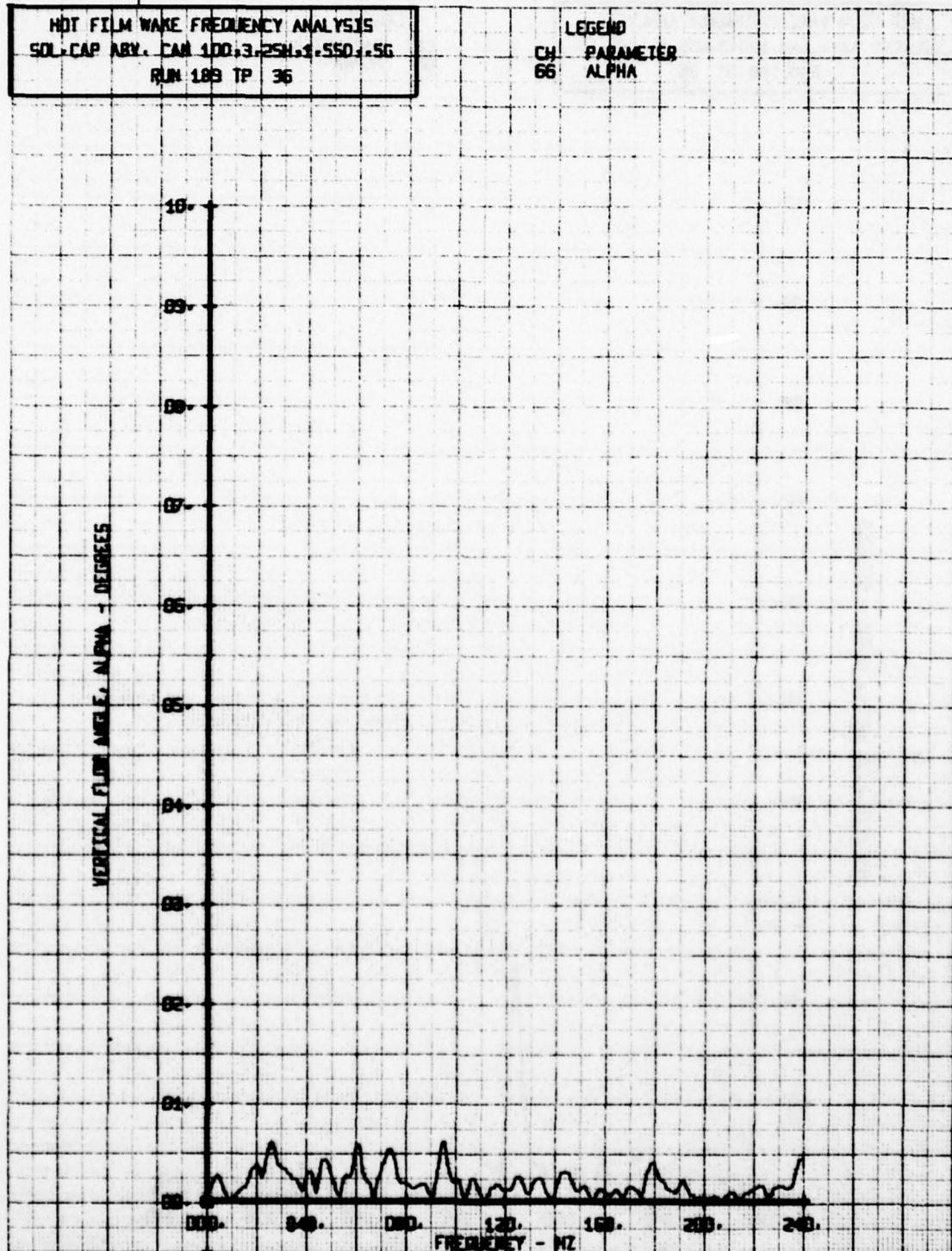
HOT FILM WAKE FREQUENCY ANALYSIS
SOL CAP ABV CAN 100-3-25N-1-550-56
RUN 189 TP 35

LEGEND
CH 66 PARAMETER
66 ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
SOL-CAP ARY. CAN 100.3.25H.1.550.5G
RUN 189 TP 36

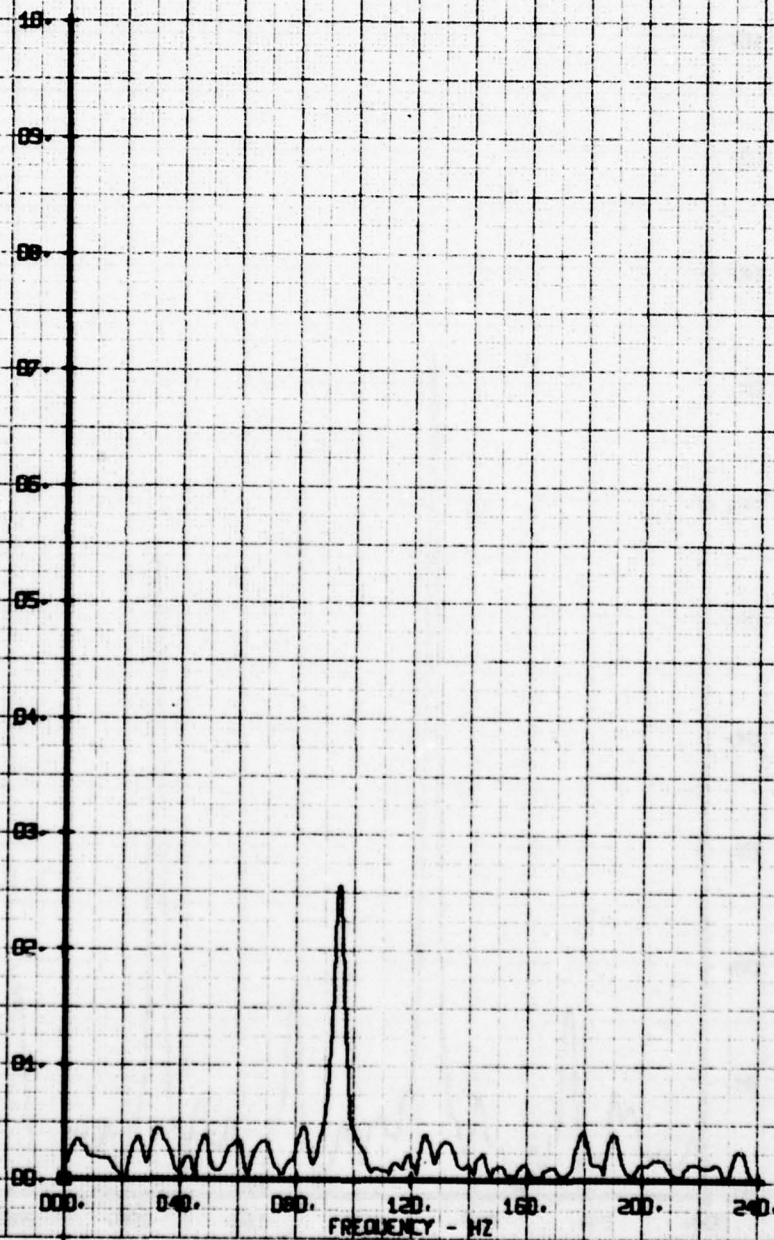
LEGEND
CH 66
PARAMETER
ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ARY. CAN 100.3-25H.1-550.5G
RUN 183 TP 37

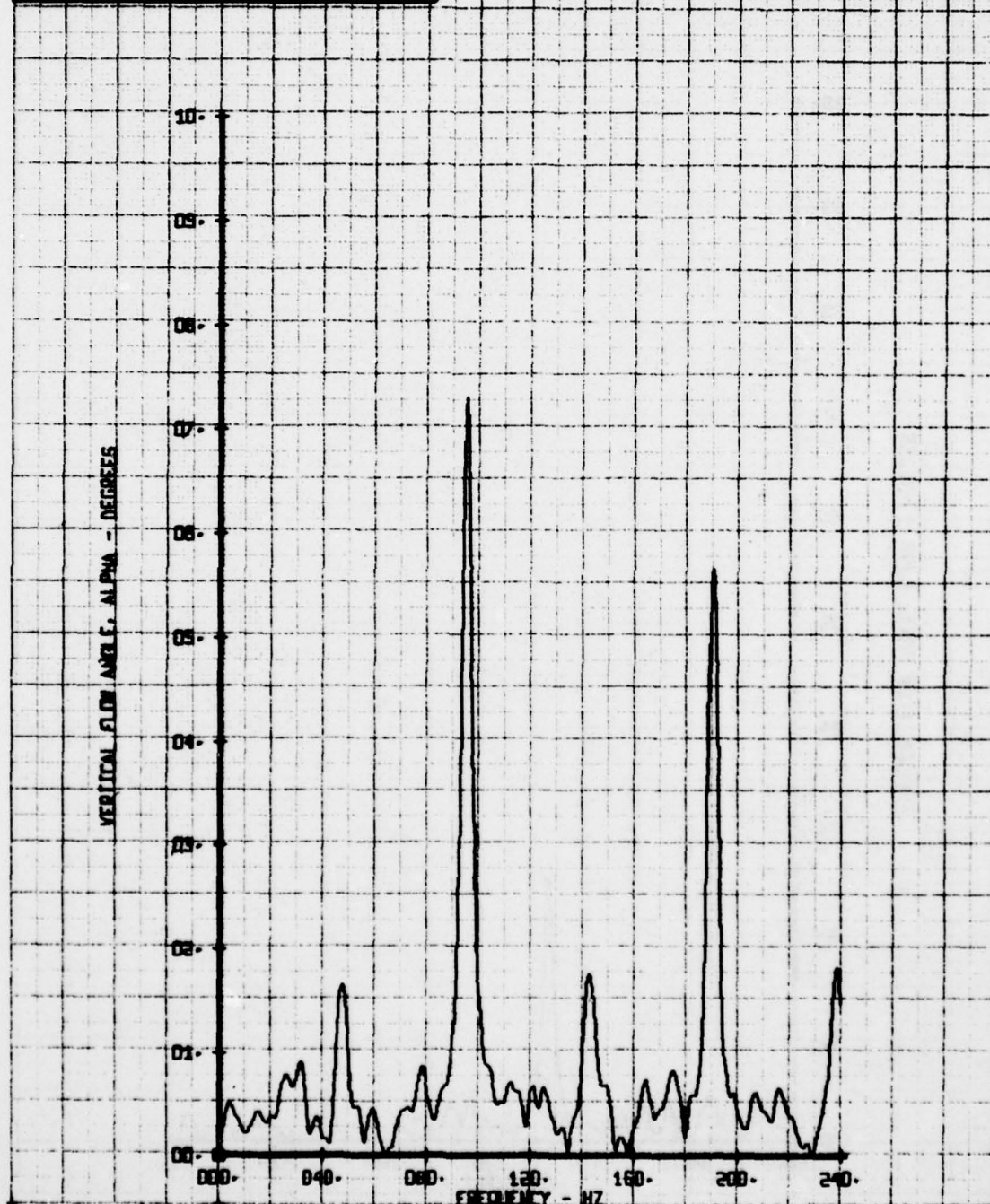
LEGEND
CH 56 PARAMETER
56 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



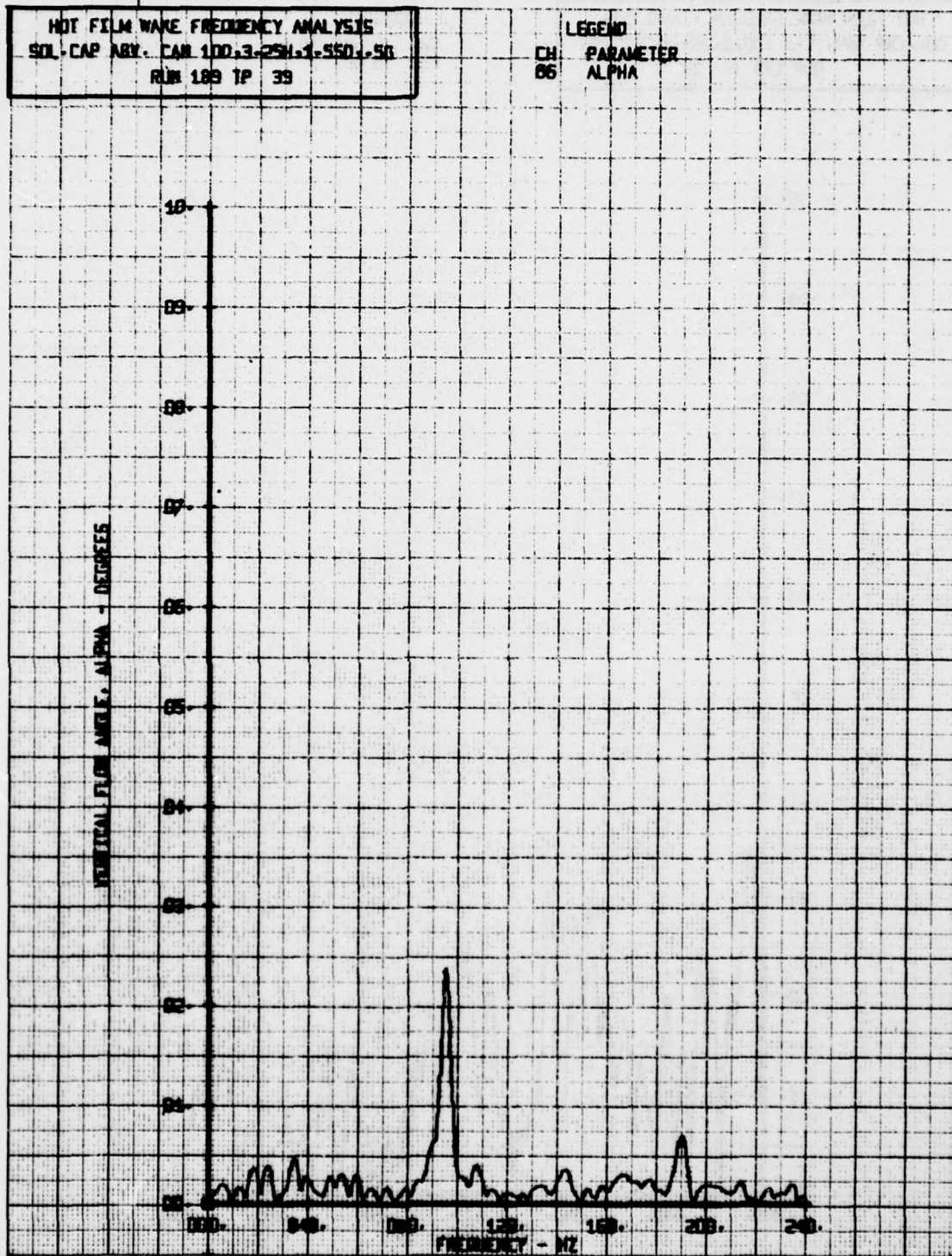
HOT FILM WAVE FREQUENCY ANALYSIS
 SOL CAP APT CAR 100.3 25H.1-560-56
 RUN 109 TP 30

LEGEND
 CH PARAMETER
 66 ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ARV. CAN 100.3-25H.1-550.56
RUN 189 TP 39

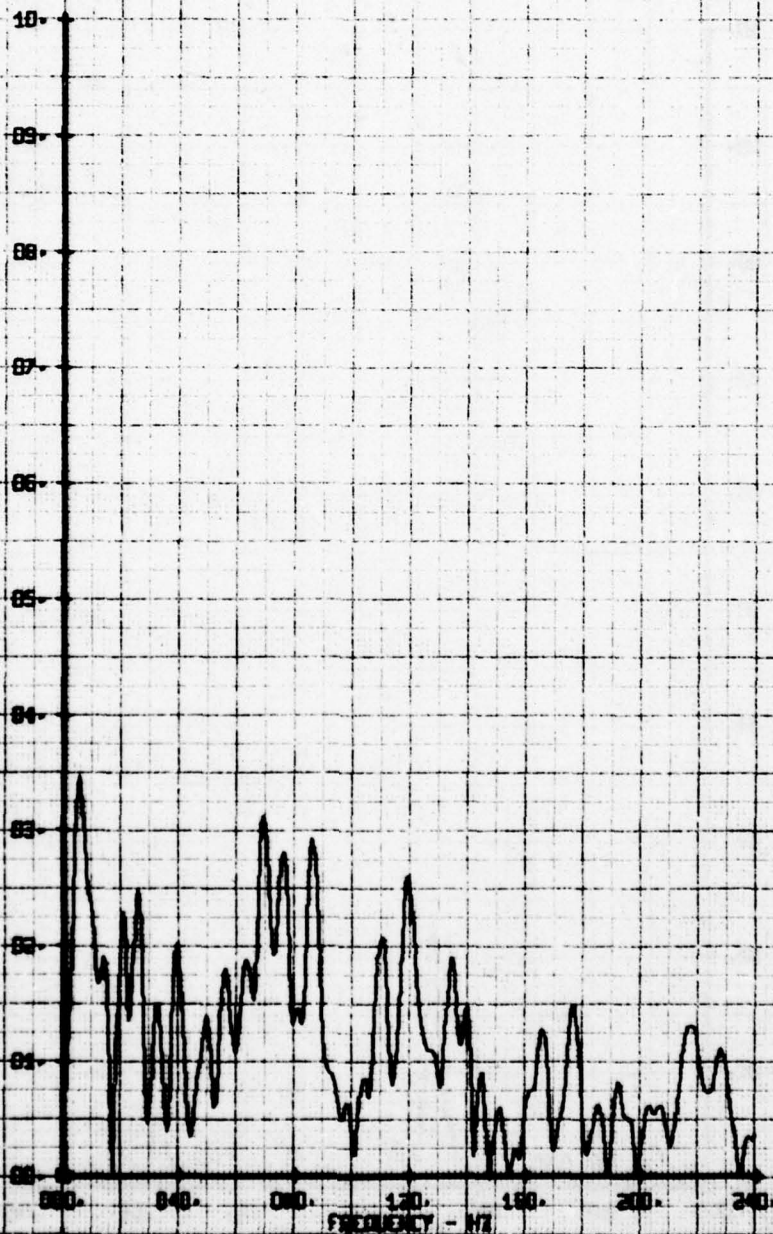
LEGEND
CH 06 PARAMETER
06 ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ABY. CAN 100.3.25H.1.550.5G
RUN 189 TP 29

LEGEND
CH 65 PARAMETER
65 BETA

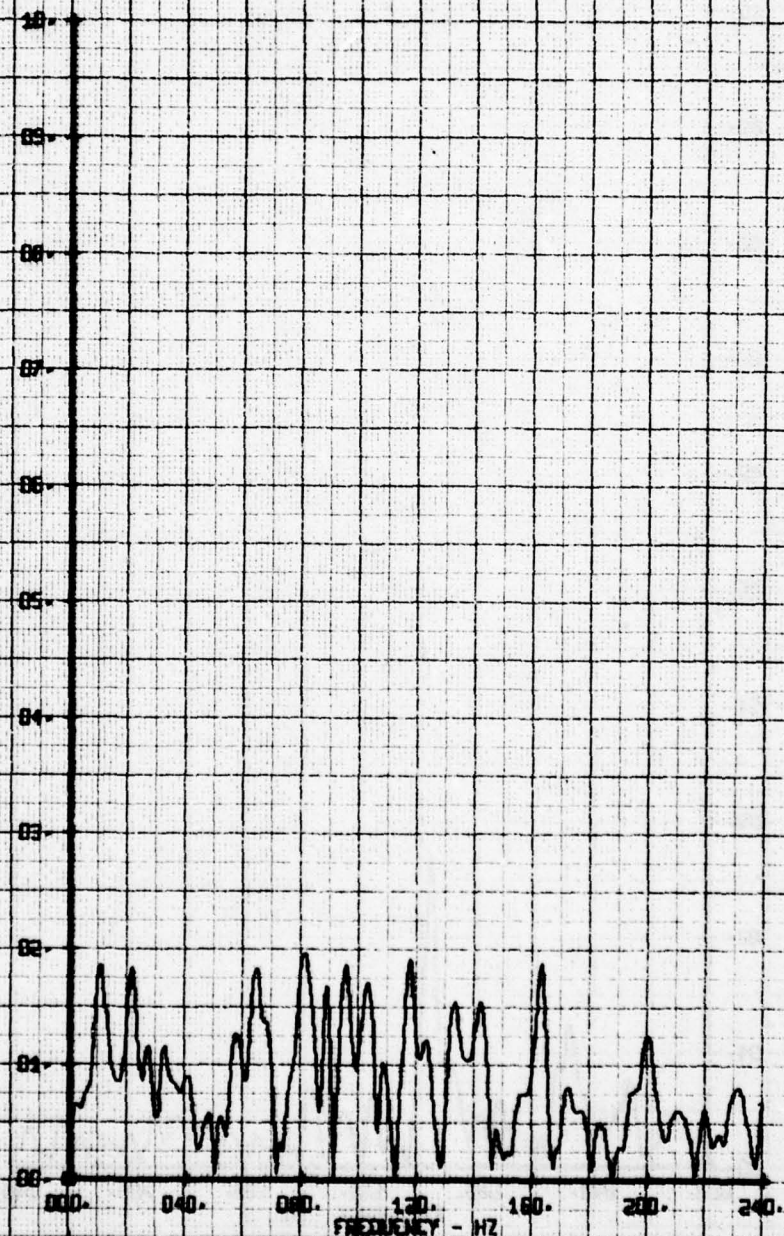
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAVE FREQUENCY ANALYSIS
 SOL CAP AMP. FAN 100.3.25H.1.550.56
 RUN 183 TP 30

LEGEND
 CH PARAMETER
 65 BETA

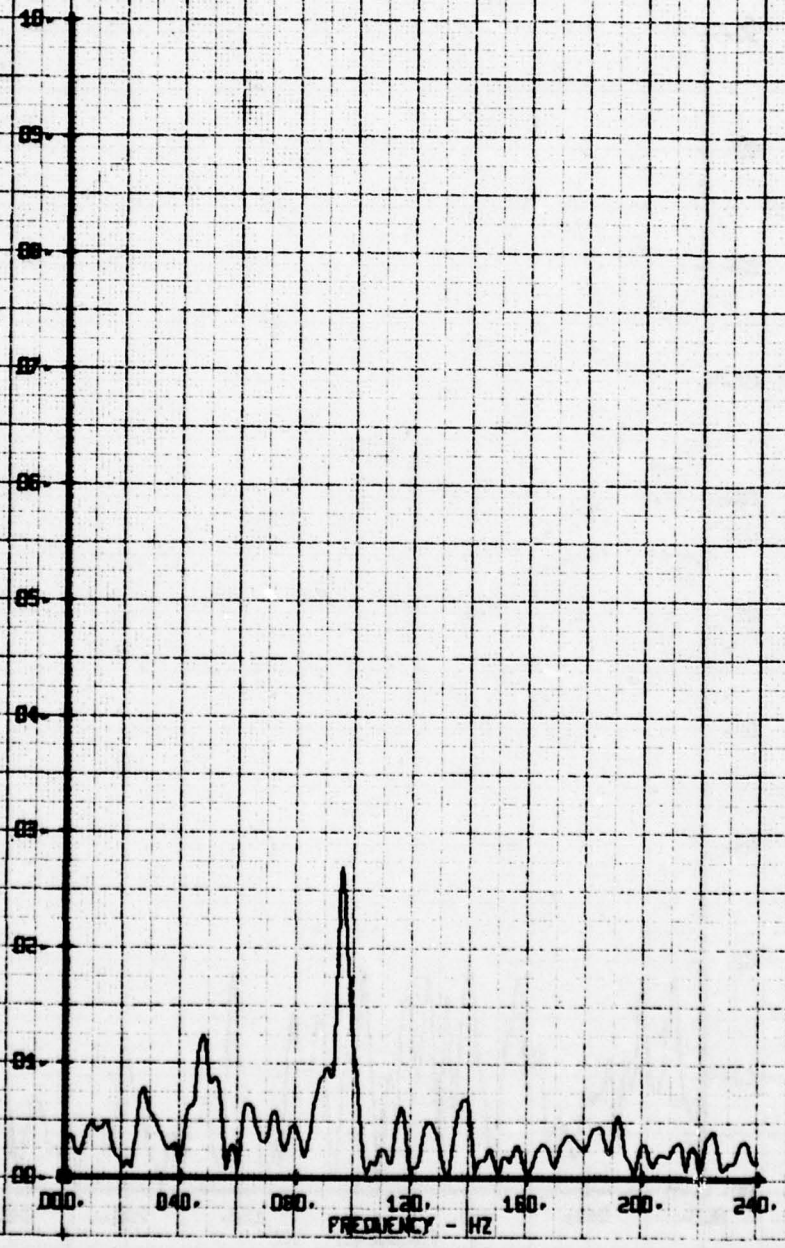
LATERAL FLOW ANGLE E. BETA - DEGREES



HOT FILM WARE FREQUENCY ANALYSIS
 SOL CAP ABY. FAN 100.3.25H.1.550.56
 RUN 189 TP 31

LEGEND
 CH PARAMETER
 BS BETA

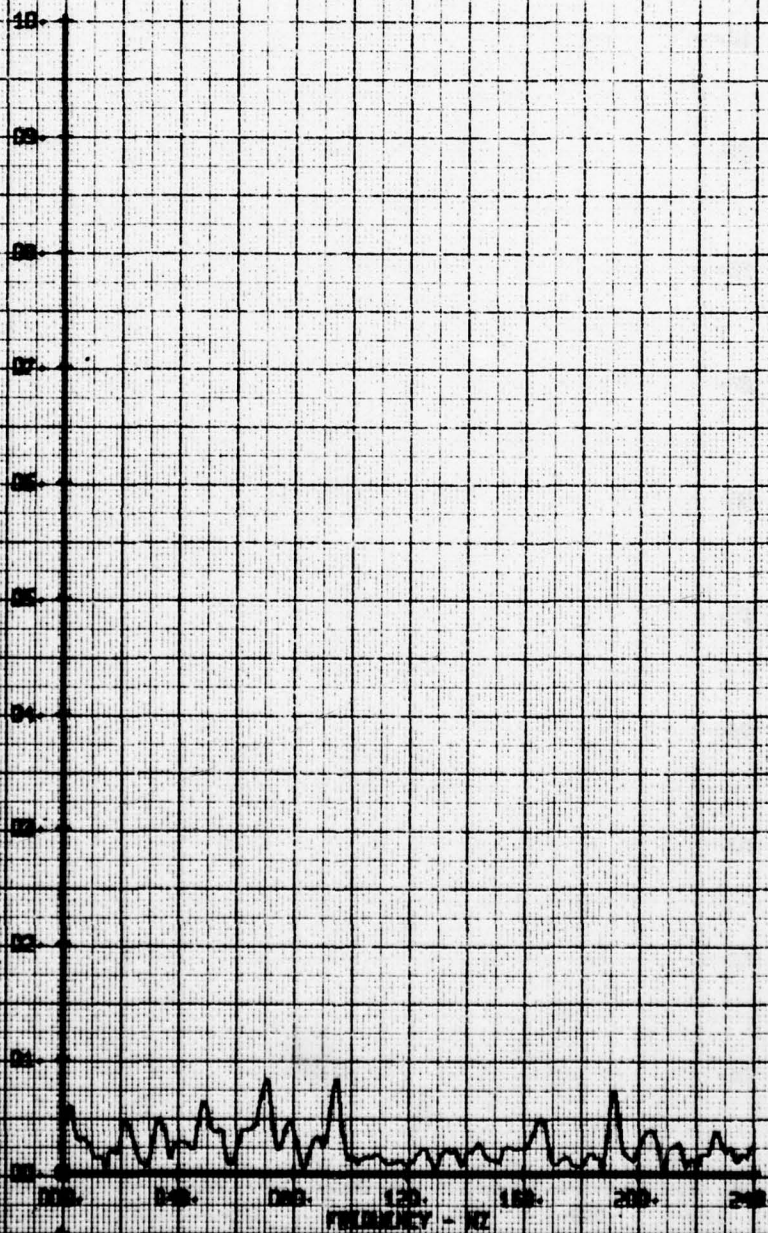
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE FREQUENCY ANALYSIS
 SOL CAP ARG. CAR 100, 3-25N, 1-550, -50
 RUN 189 TP 32

LEGEND
 CH PARAMETER
 65 BETA

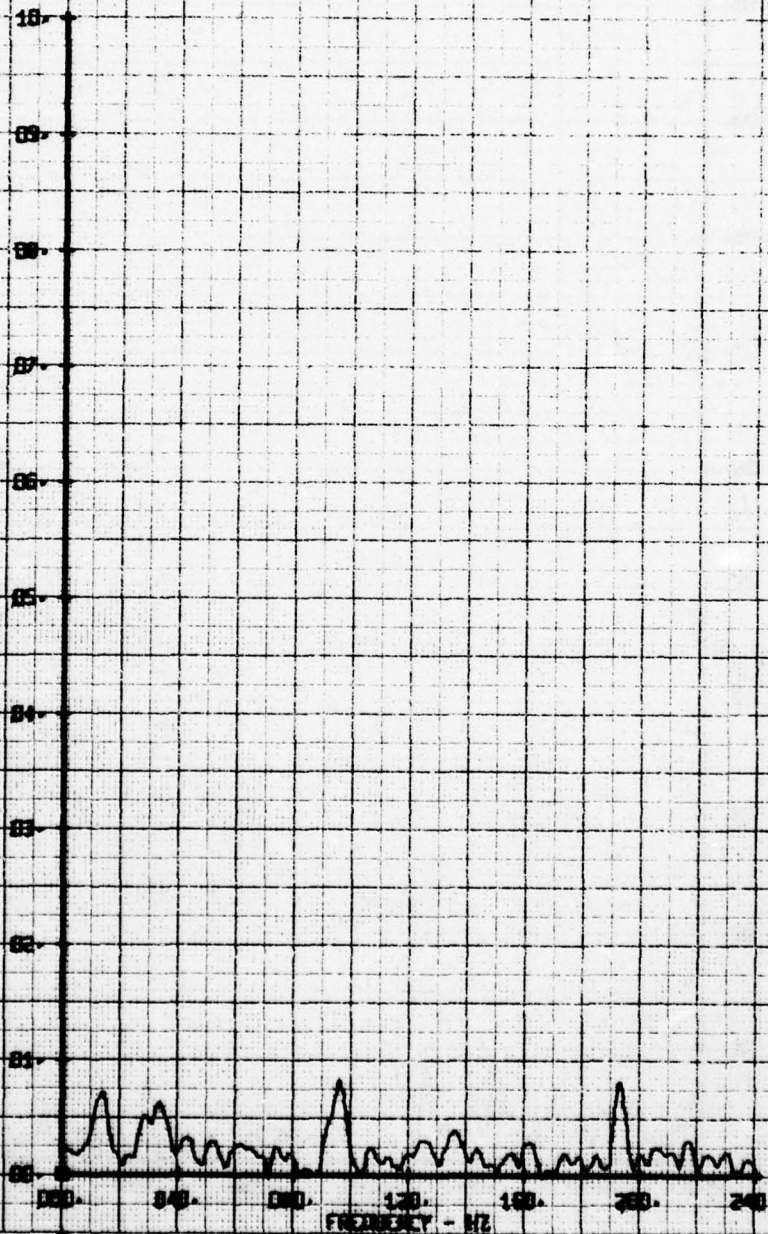
LANTANA FILM ANGLE, BETA - DEGREES



HOT FILM WAKE FREQUENCY ANALYSIS
SOL-CAP ARV. CAR 100.3-25H.1-550.56
RUN 180 TP 33

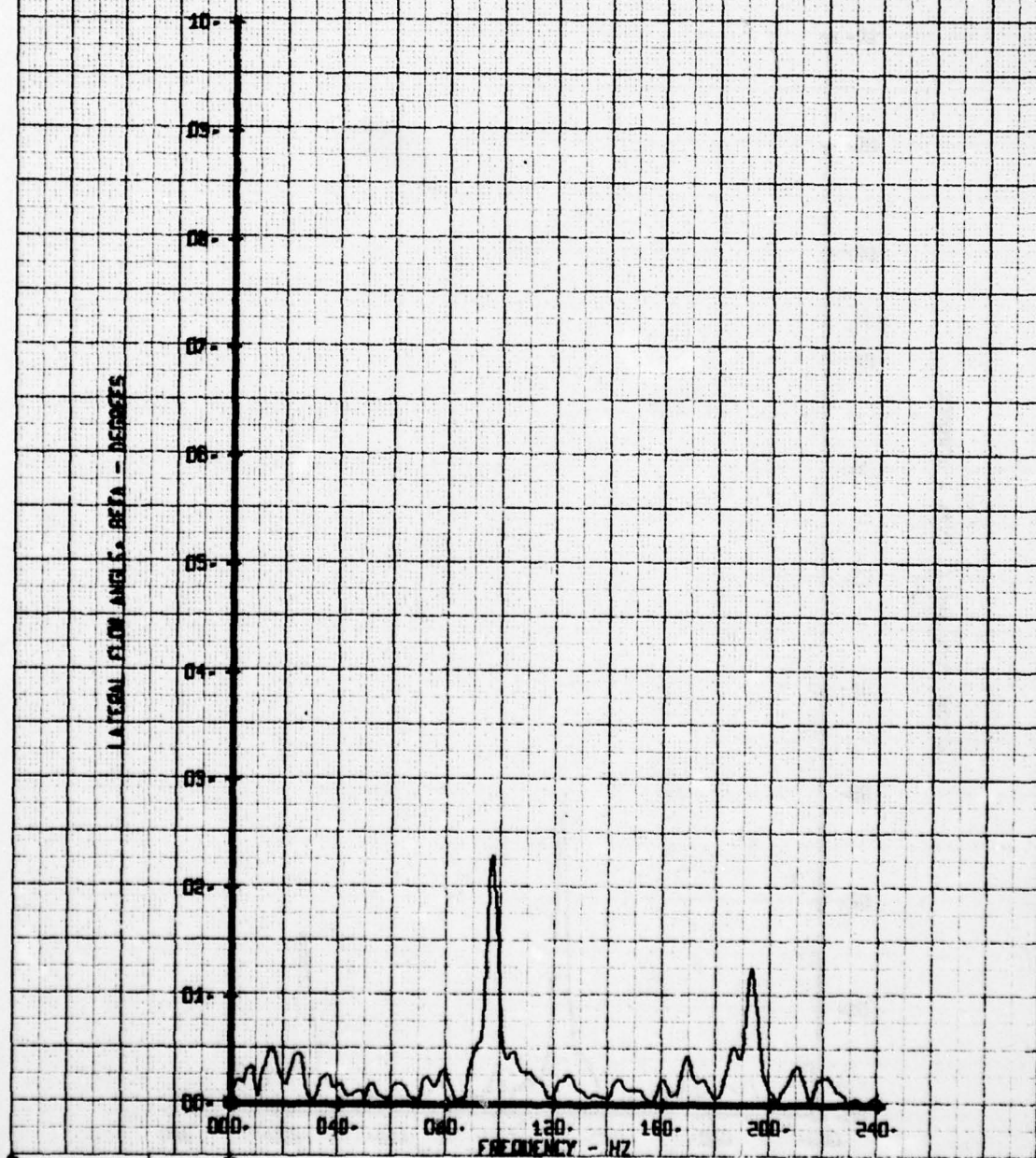
LEGEND
CH 65 PARAMETER
65 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



NOT FILM WAVE FREQUENCY ANALYSIS
EOL CAPARY CAN 100-3 354.1-550-52
RUN 189 1P 24

LEGEND
CH PARAMETER
65 BETA



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BOEING VERTOL CO PHILADELPHIA PA
INTERACTIONAL AERODYNAMICS OF THE SINGLE ROTOR HELICOPTER CONF--ETC(U)
SEP 78 P F SHERIDAN

F/G 1/3

DAAJ02-77-C-0020

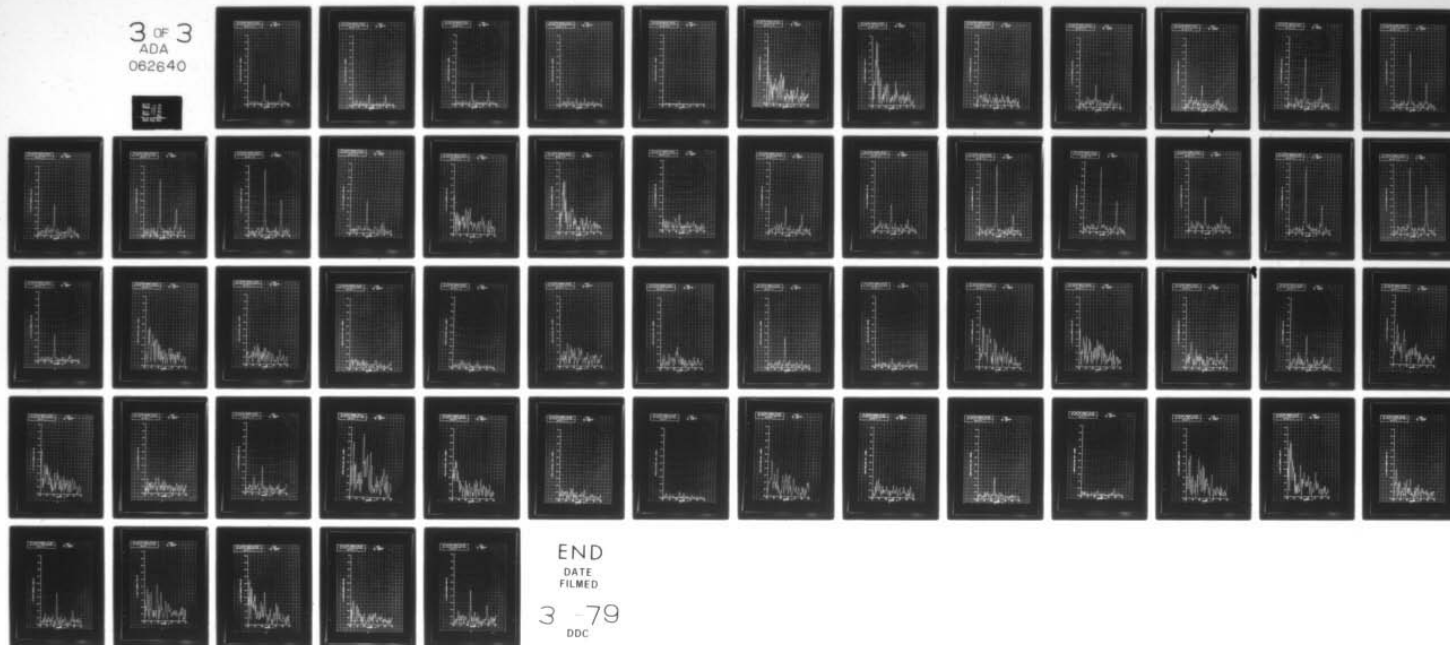
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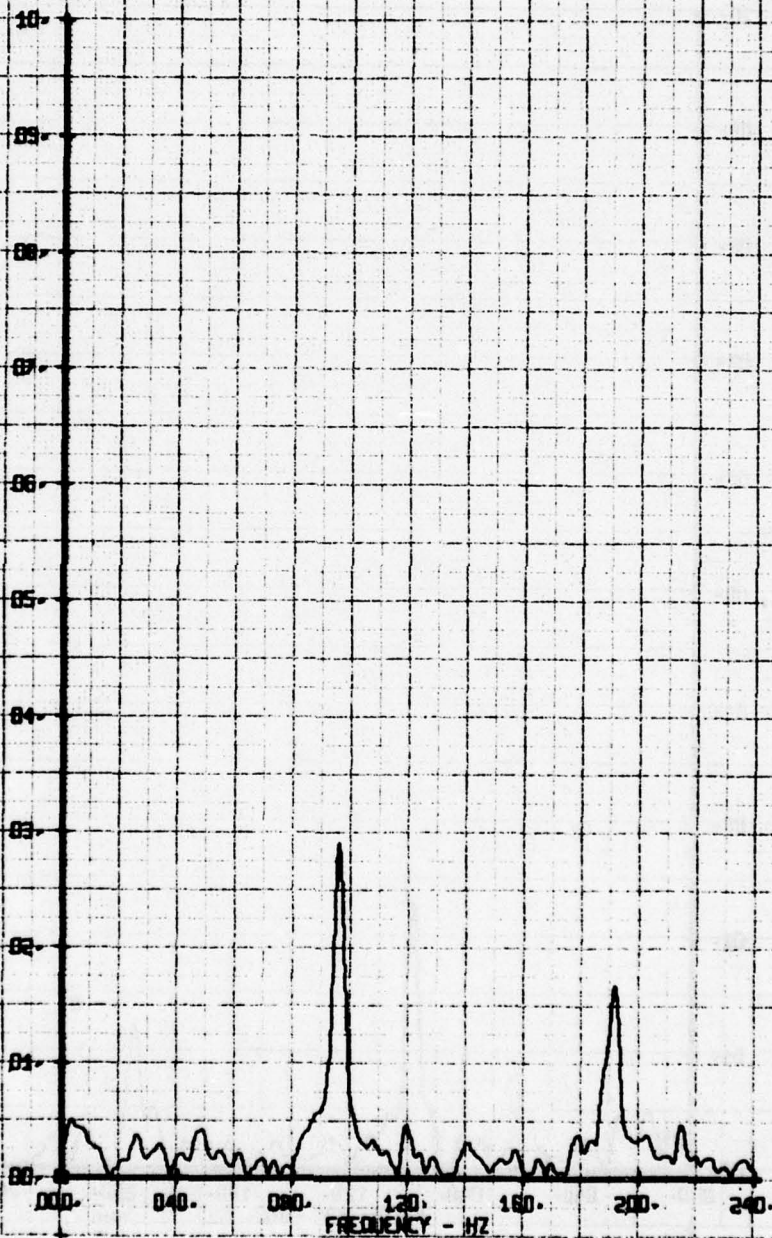
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DATE
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HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ABT. CAN. 100.3.254.1.550.450
RUN 189 TP. 35

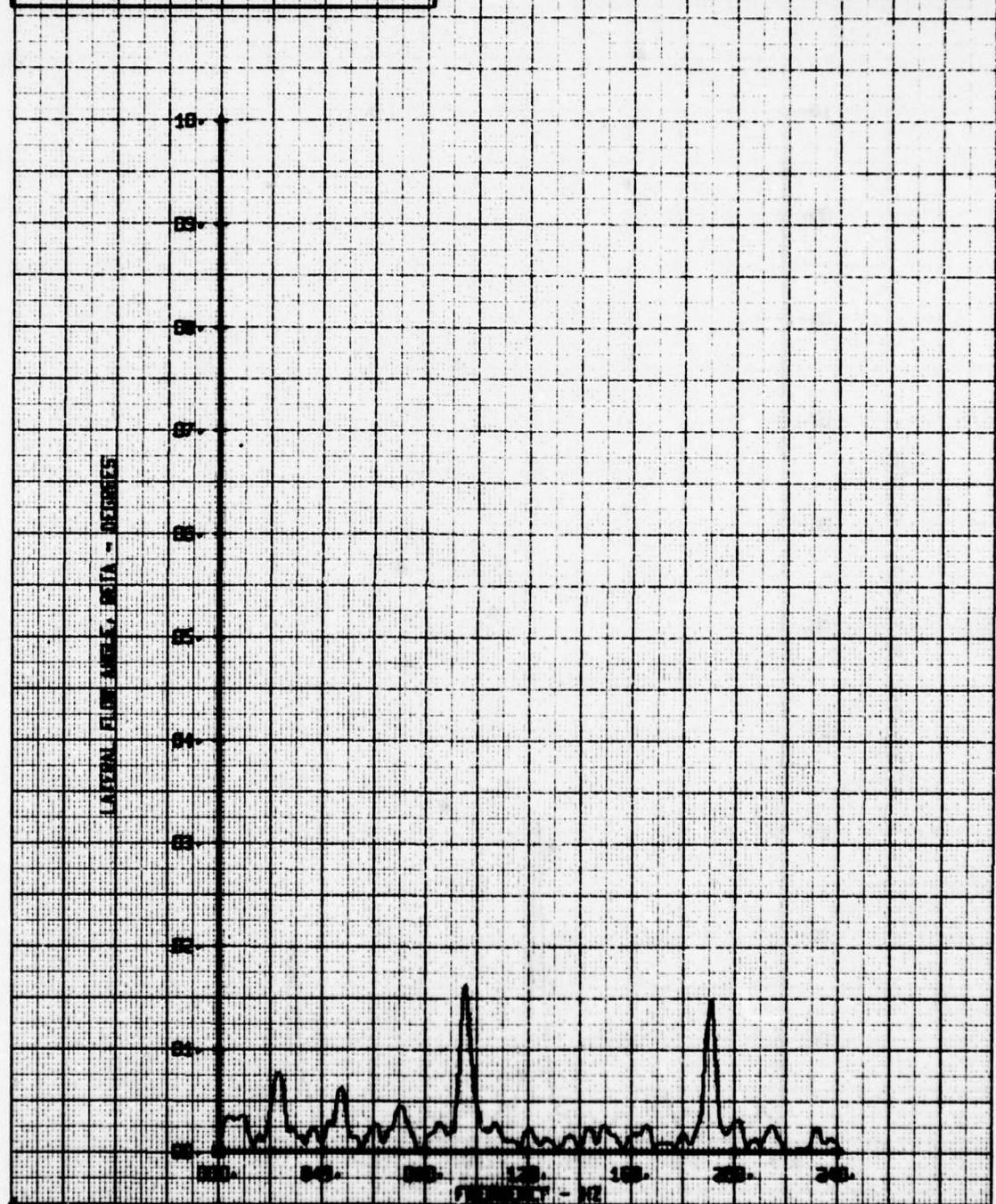
LEGEND
CH. 65
PARAMETER
BETA

LATERAL FLOW ANGLE, BETA - DEGREES



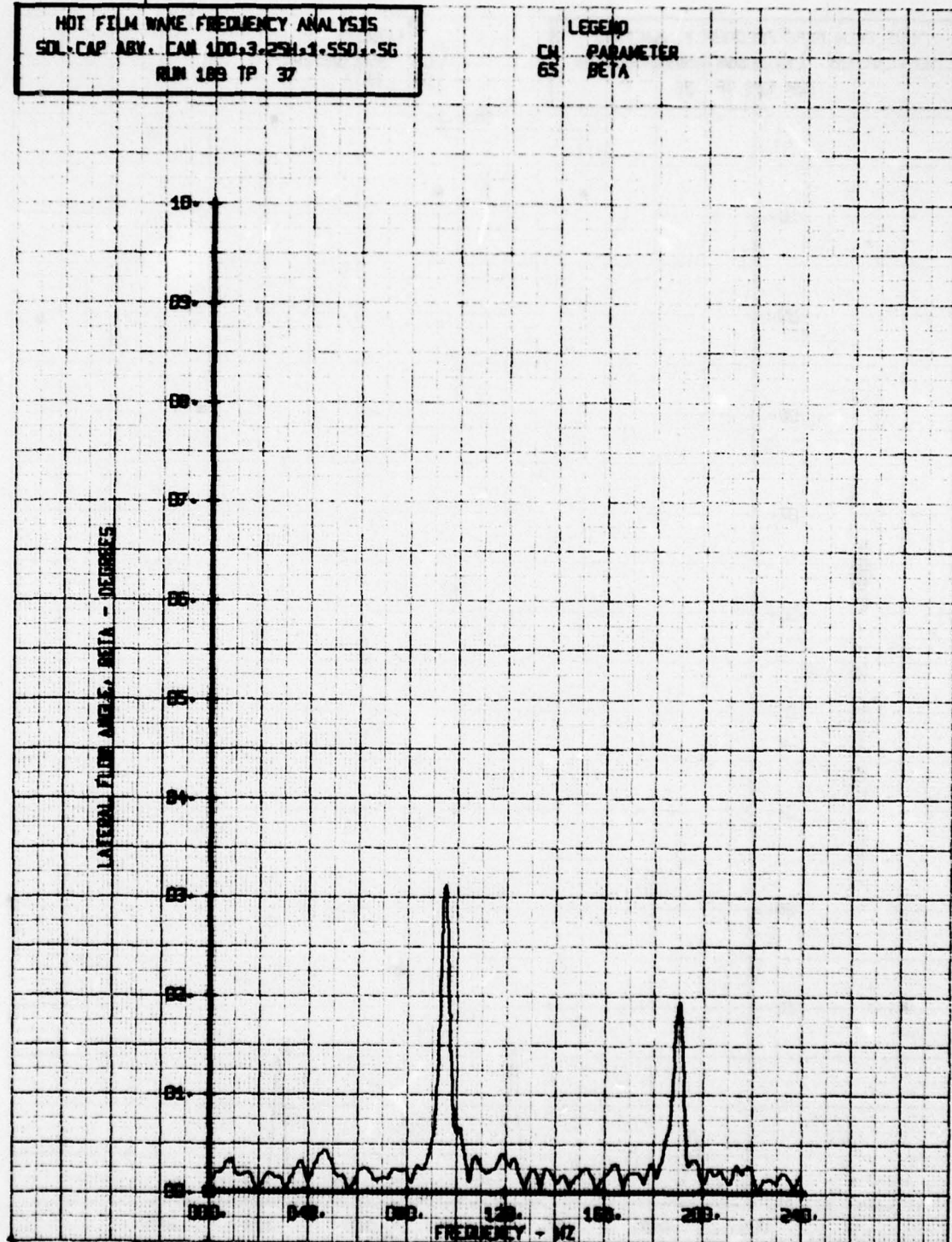
HOT FILM WAKE FREQUENCY ANALYSIS
 SOL CAP ARV. CAN 100.3-25H.1-550.56
 RUN 189 TP 36

LEGEND
 CH. PARAMETER
 65 BETA



HOT FILM WAVE FREQUENCY ANALYSIS
SOL-CAP ARV. CAN 100.3-25H.1-550.5G
RUN 189 TP 37

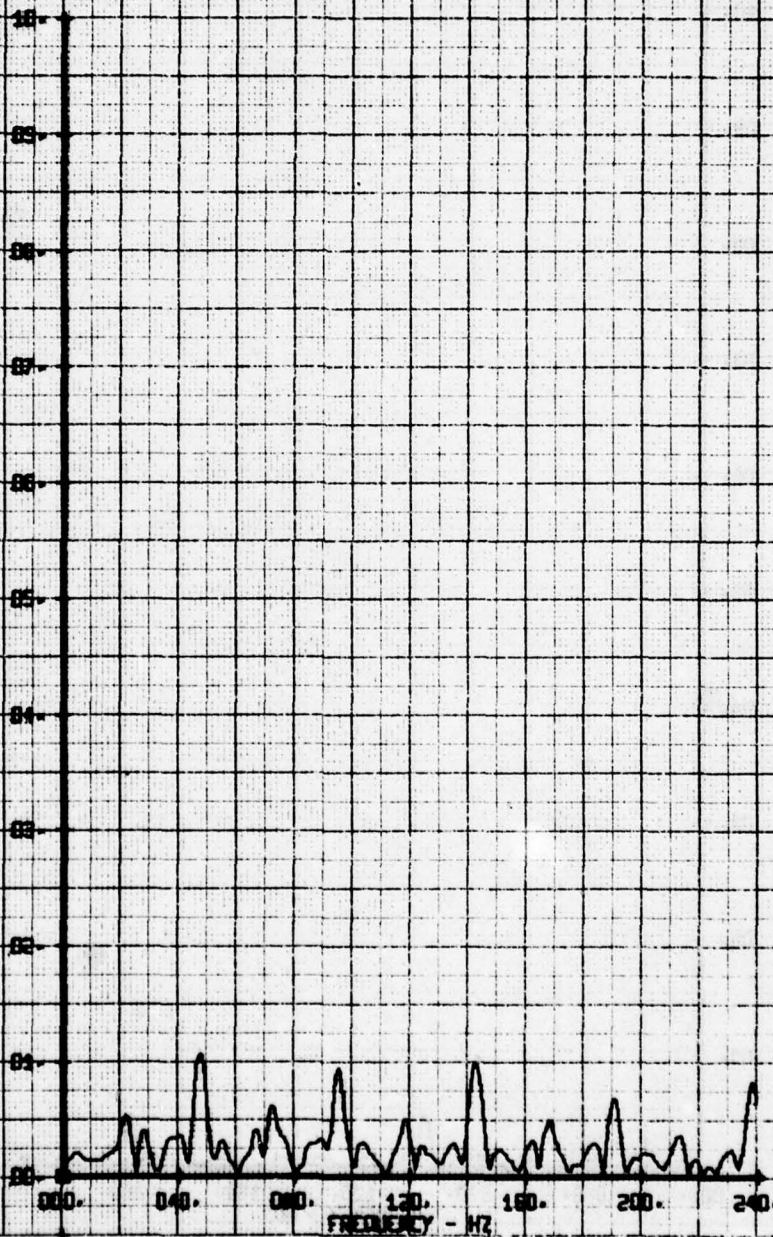
LEGEND
CH 65
PARAMETER
BETA



HBT FILM WAVE FREQUENCY ANALYSIS
SOL CAP ABY. CAN 100.3.25H.1.550.56
SEN 189 TP 38

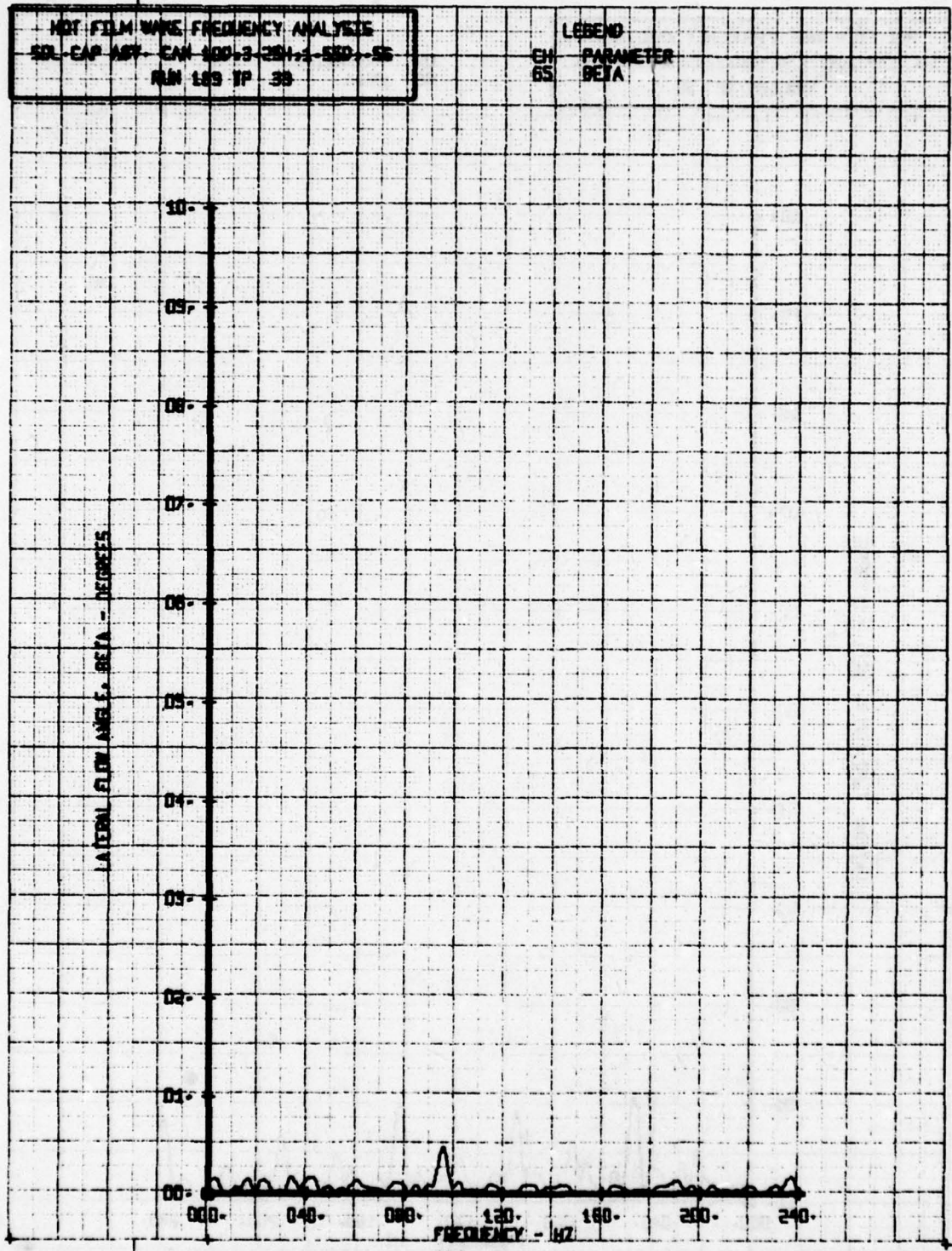
LEGEND
CH 65
PARAMETER
BETA

LATERAL FLOW ANGLE, BETA - DEGREES



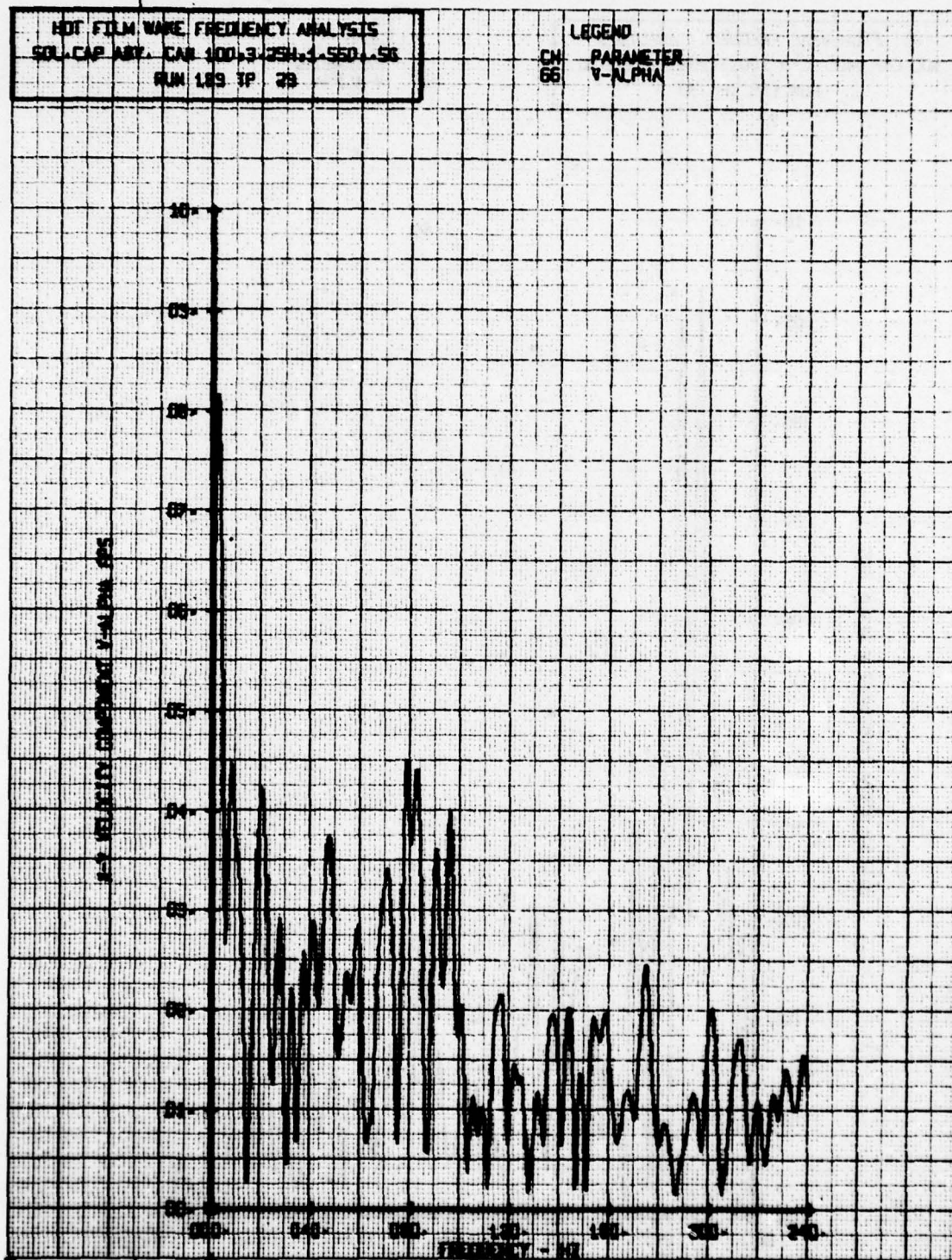
HOT FILM WIRE FREQUENCY ANALYSIS
 SOL CAP ACT CAN 100-3-28-1-1-500-SS
 RUN 189 TP 38

LEGEND
 CH1 PARAMETER
 65 BETA



HOT FILM WAVE FREQUENCY ANALYSIS
 SOL-CAP ABT. CAN 100-3-25H-1-550-51
 RUN 189 TP 29

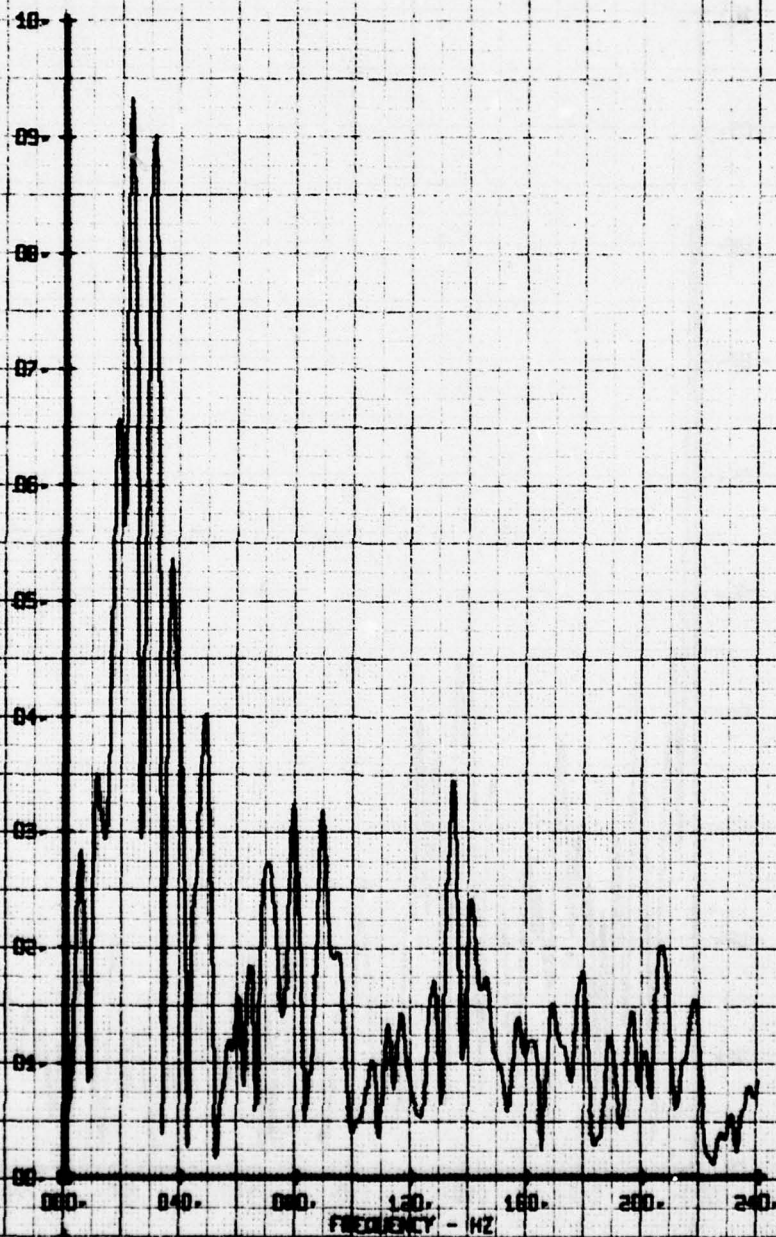
LEGEND
 CH PARAMETER
 66 V-ALPHA



NOT FILM WARE FREQUENCY ANALYSIS
SOL-CAP ARY. CAN 100.3.25H.1.550..SG
RUN 189 IP 30

LEGEND
CH 66
PARAMETER
V-ALPHA

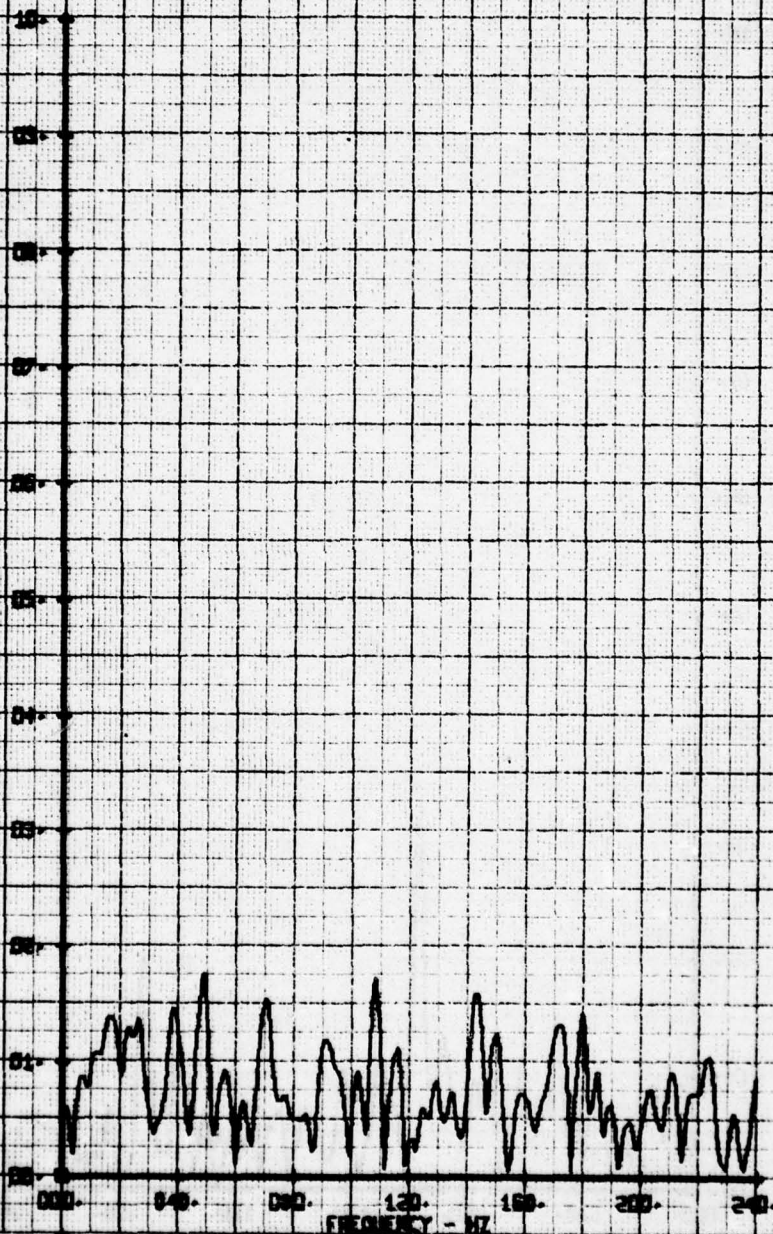
N-Y VELOCITY COMPONENT V-ALPHA RMS



NOT FILM WIRE FREQUENCY ANALYSIS
 CIL CAP 100.3 254.1 550.50
 RUN 125 TP 31

LEGEND
 CH PARAMETER
 66 V-ALPHA

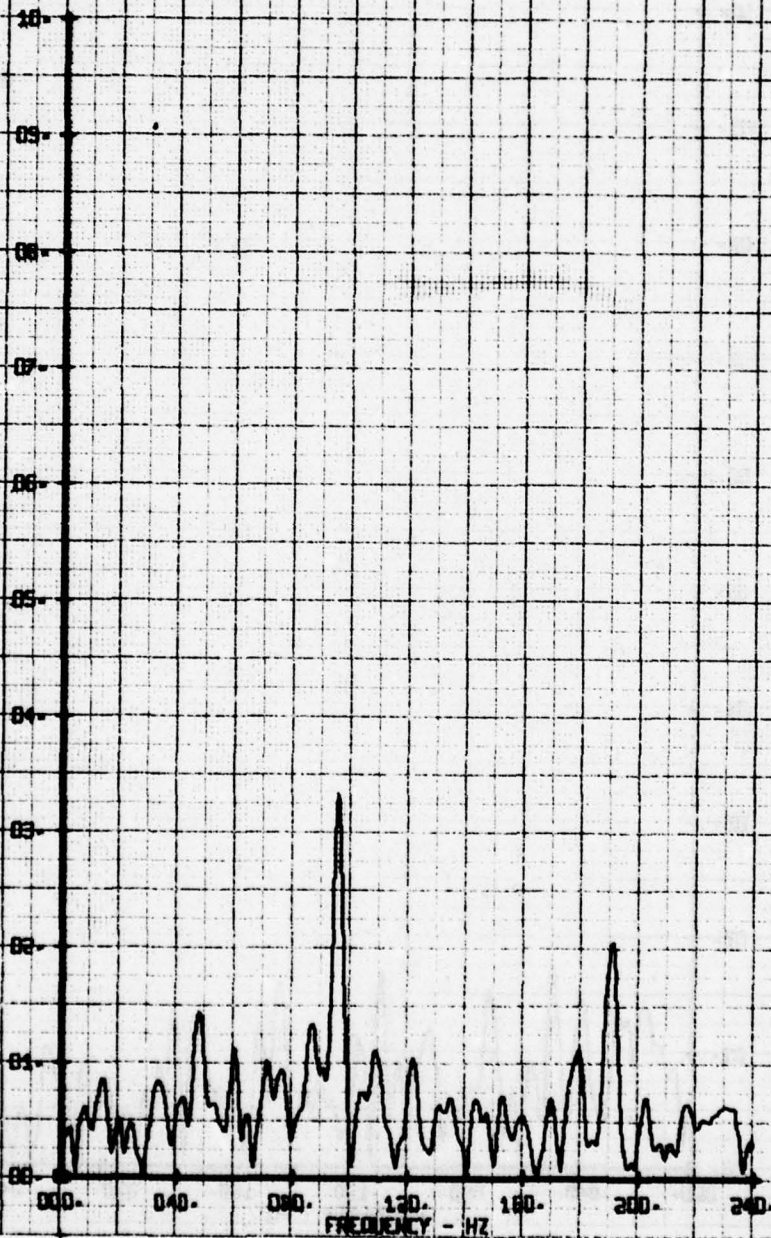
V-1 VELOCITY COMPONENT V-ALPHA EPS



HOT FILM WAKE FREQUENCY ANALYSIS
SOL CAP ABY. CAN 400.3.254.1.550.56
RUN 129 TP 32

LEGEND
CH PARAMETER
66 V-ALPHA

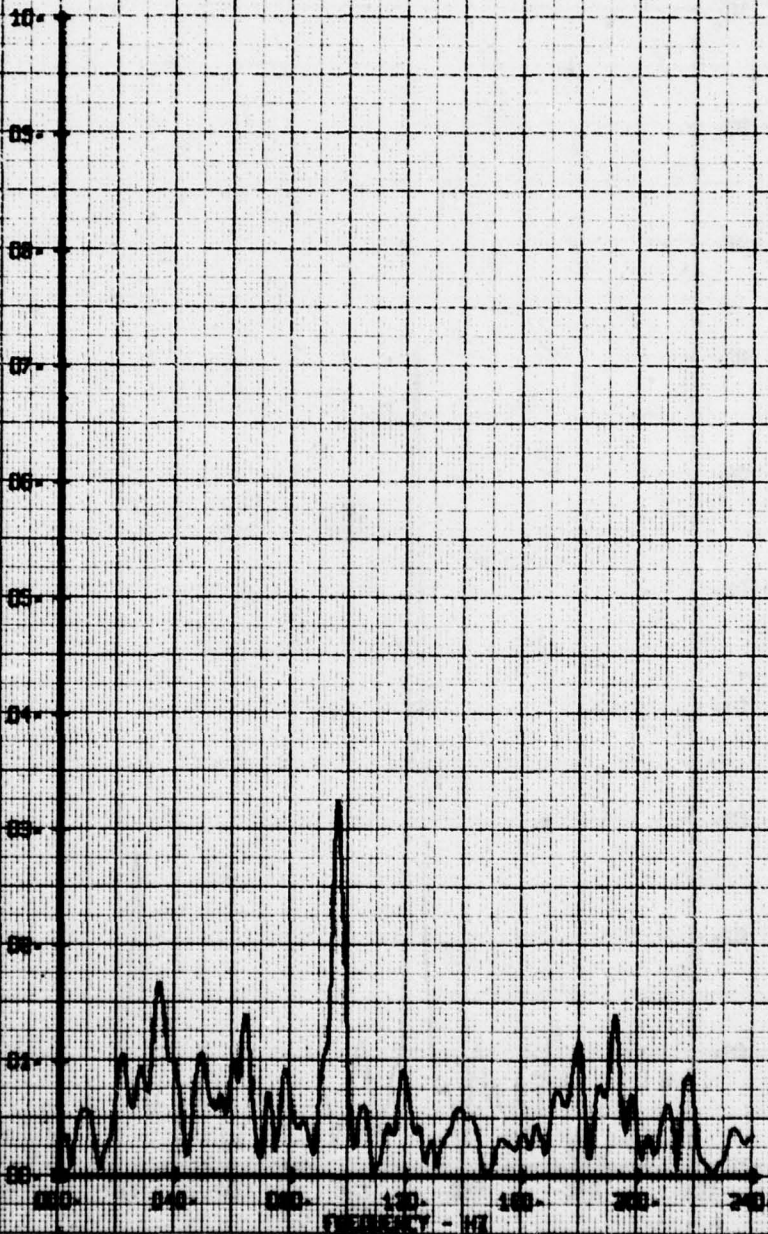
V-ALPHA COMPONENT V-ALPHA RMS



HOT FILM WAKE FREQUENCY ANALYSIS
SOL CAP ART. CAR 100-3-254-1-550-55
RUN 189 7P 33

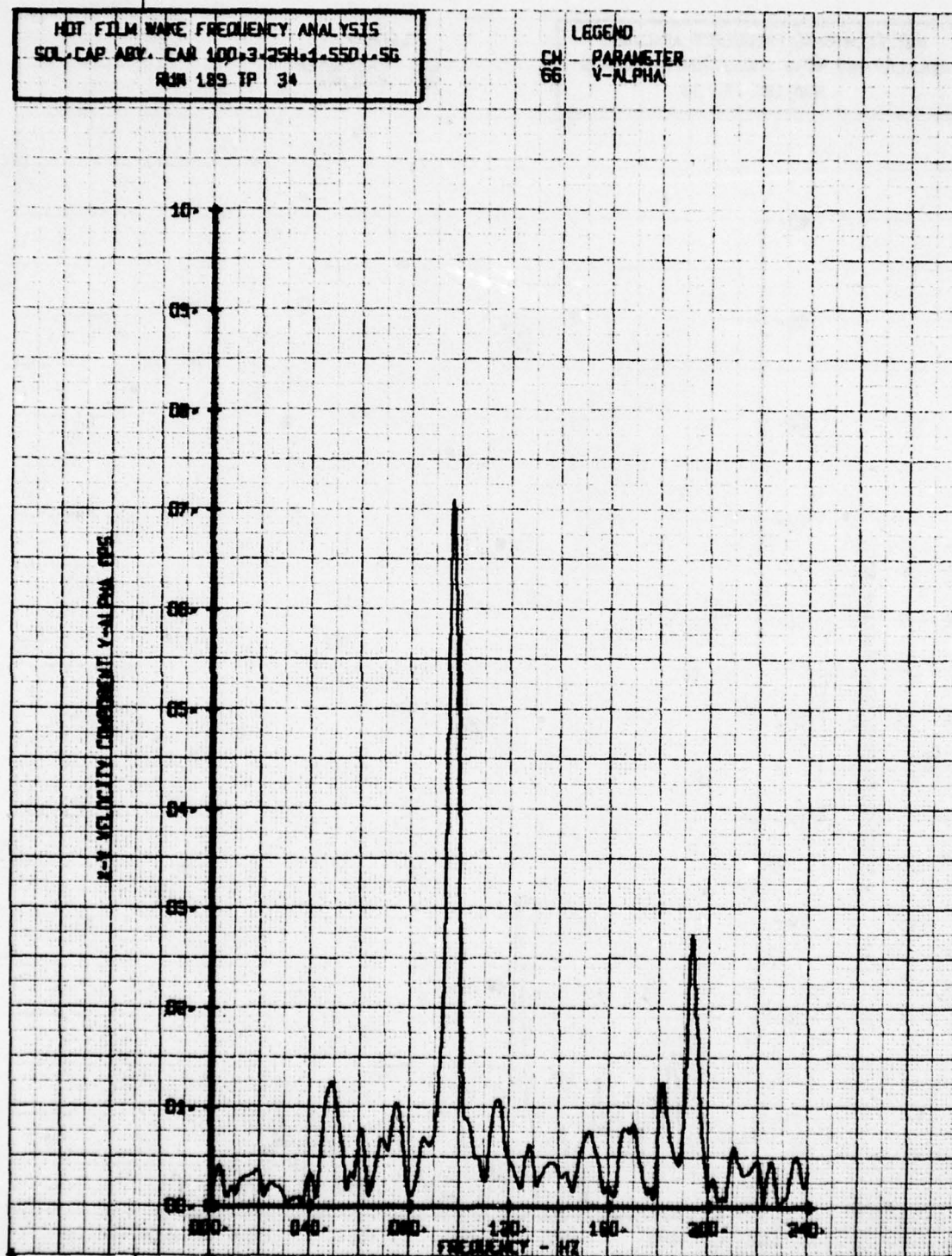
LEGEND
CH PARAMETER
66 V-ALPHA

V-ALPHA COMPONENT V-ALPHA RMS



HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ABY. CAR 100-3-25H-1-55D-5G
RUN 189 TP 34

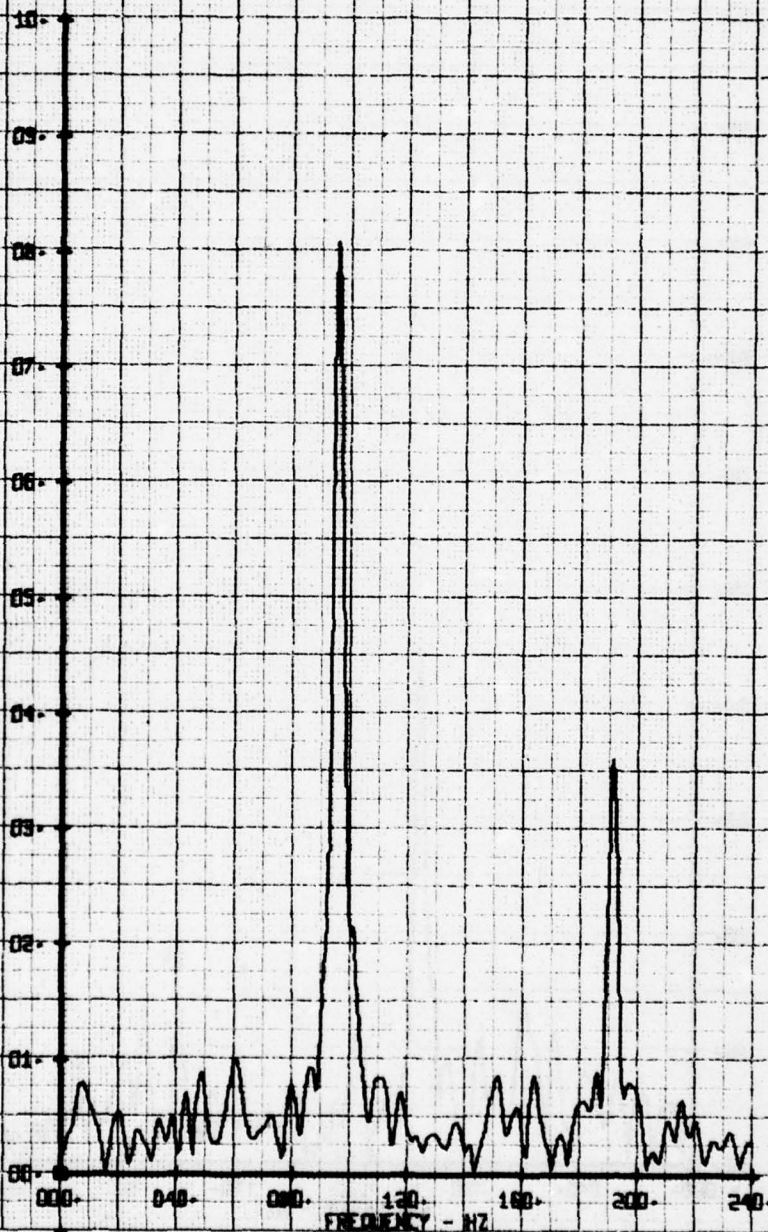
LEGEND
CH PARAMETER
66 V-ALPHA



HOT FILM WAVE FREQUENCY ANALYSIS
SOL-CAP-ARY CAR-100-3-35N-1-55D-50
RUN 100 TP 85

LEGEND
CH PARAMETER
66 V-ALPHA

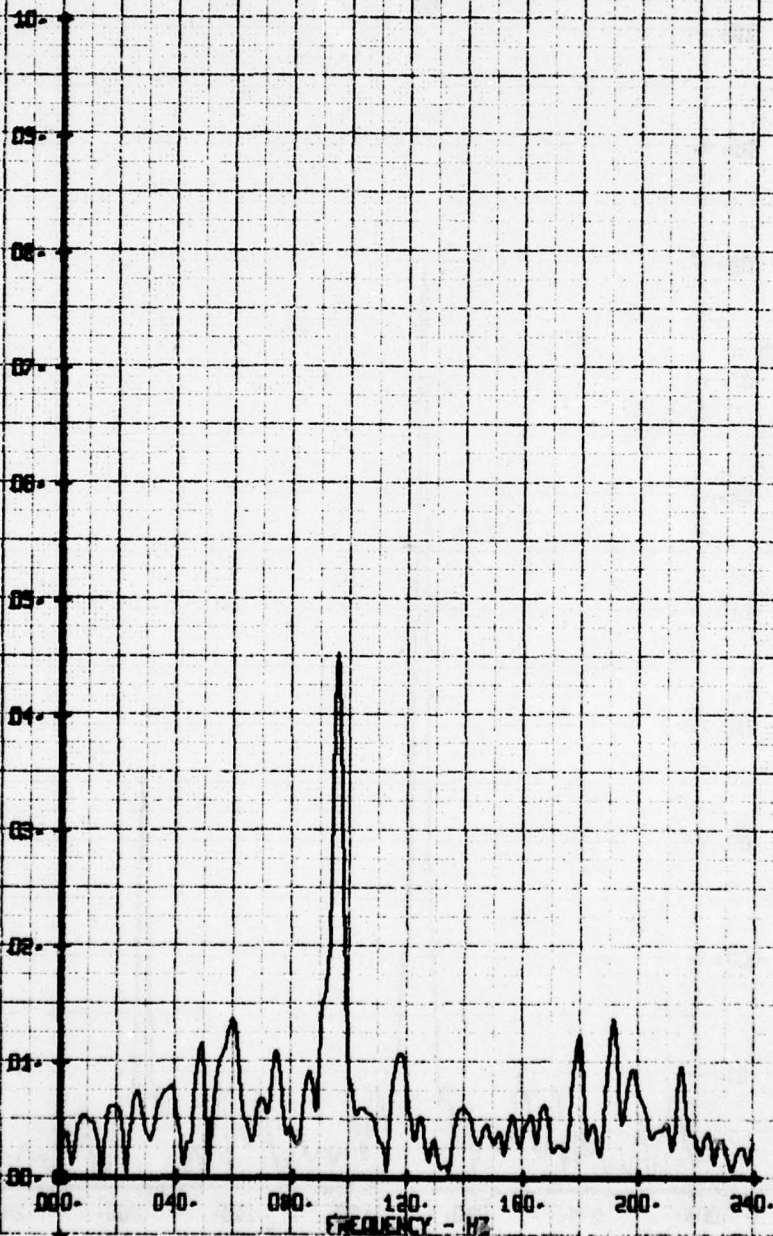
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE FREQUENCY ANALYSIS
SOL CAP APT CAN 100-3-254-1-550-55
RUN 189 7P 35

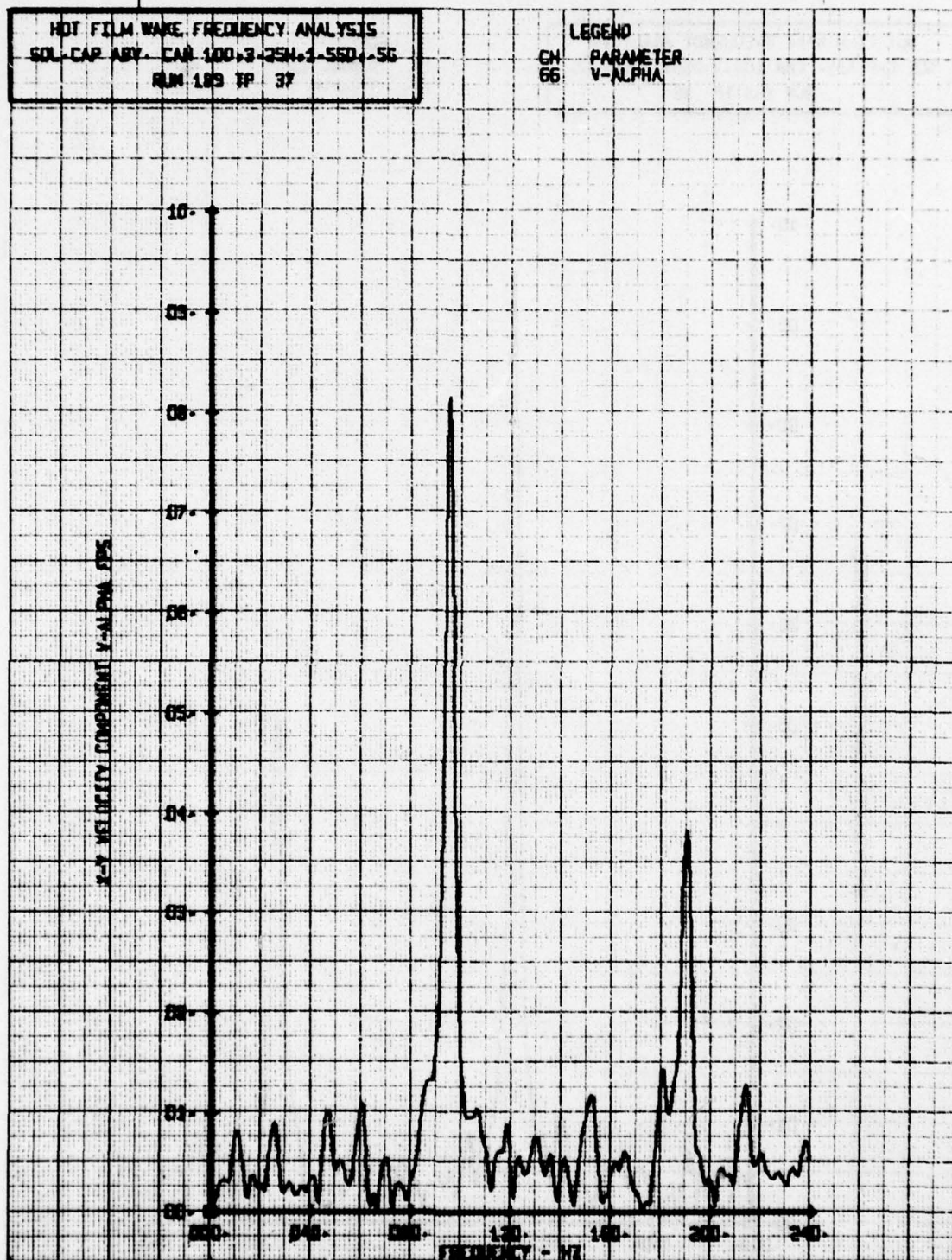
LEGEND
CH PARAMETER
06 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



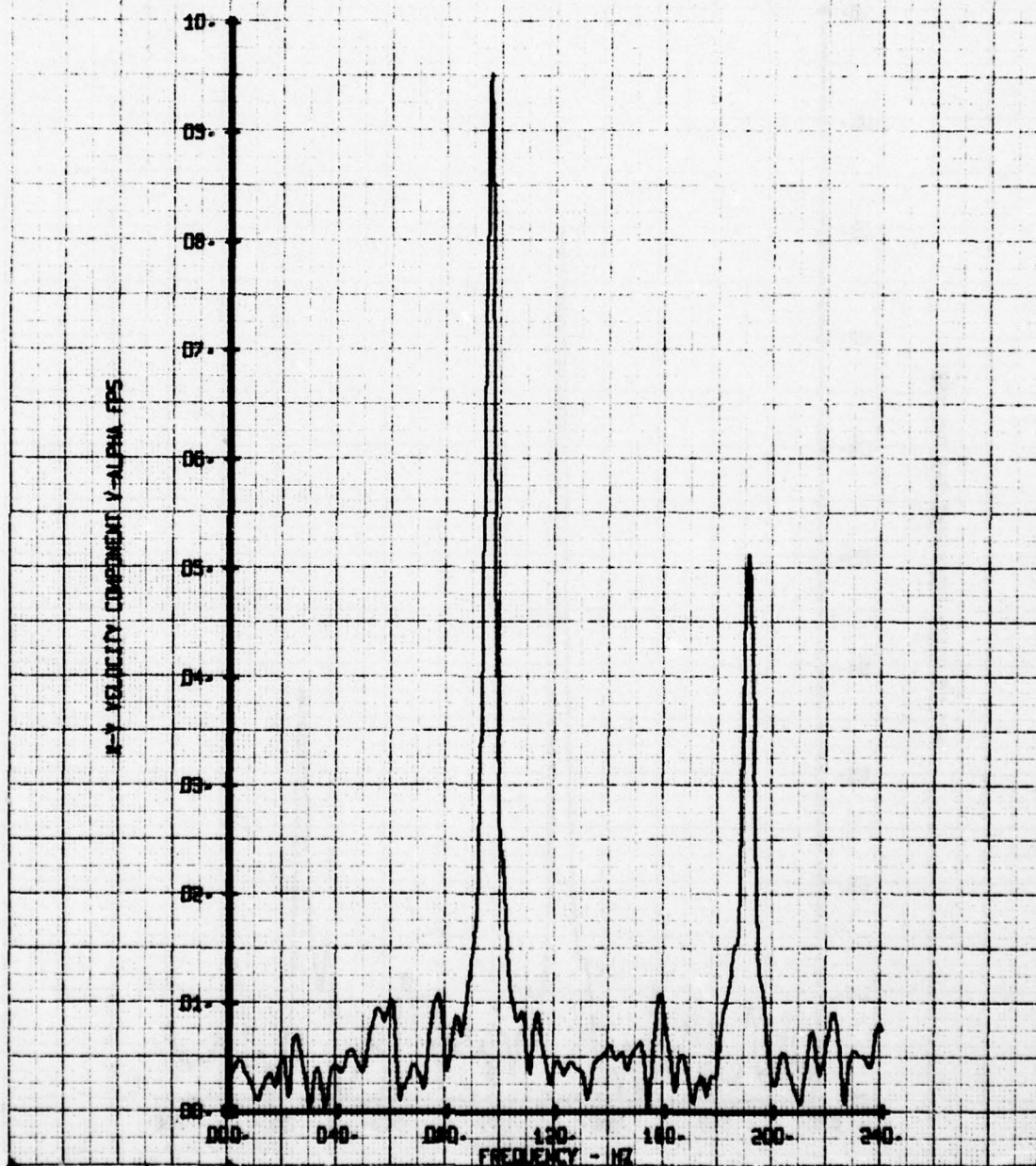
HOT FILM WAKE FREQUENCY ANALYSIS
 SOL-CAP ABY CAR 100-3-25N-1-550-56
 RUN 109 TP 37

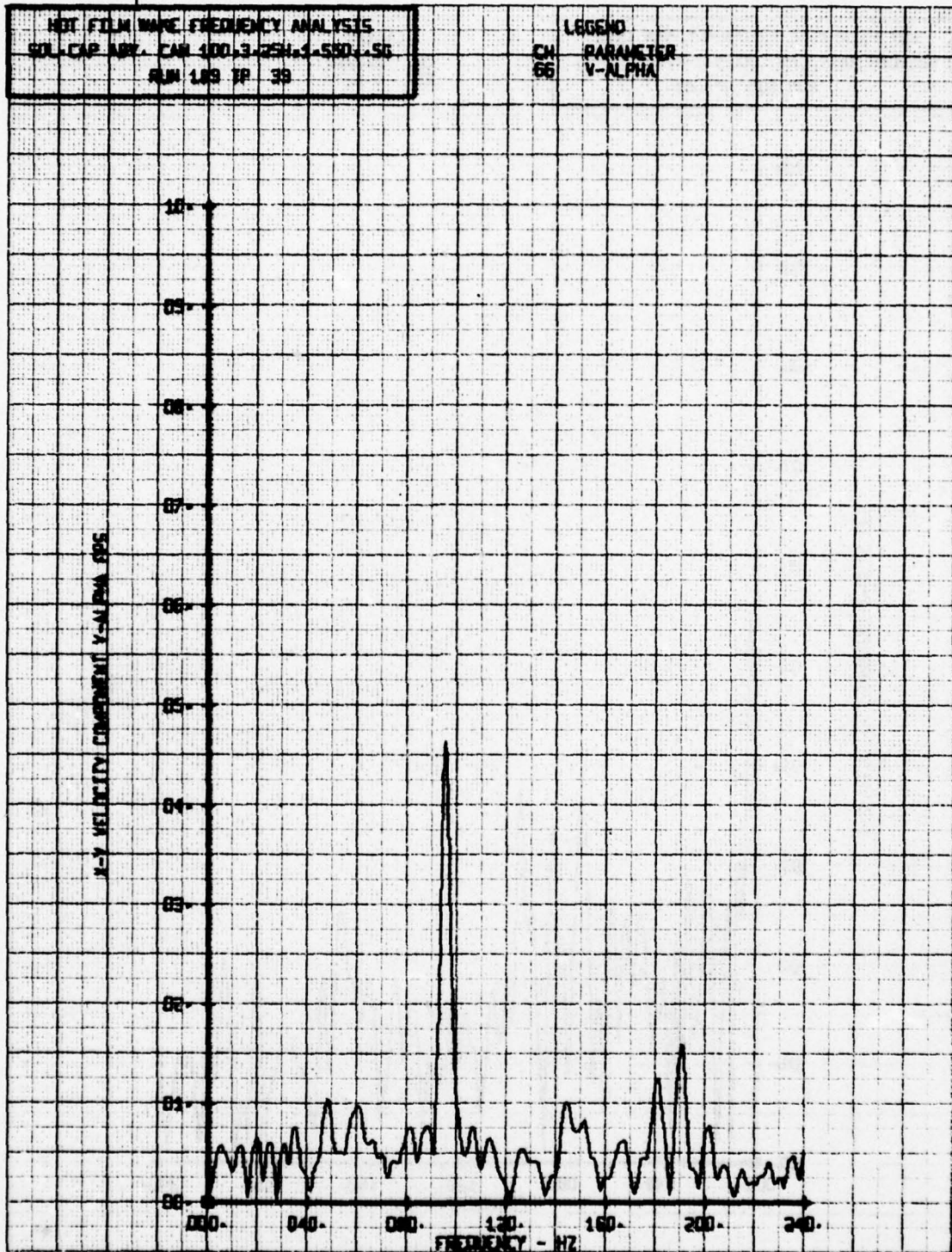
LEGEND
 CH PARAMETER
 66 V-ALPHA

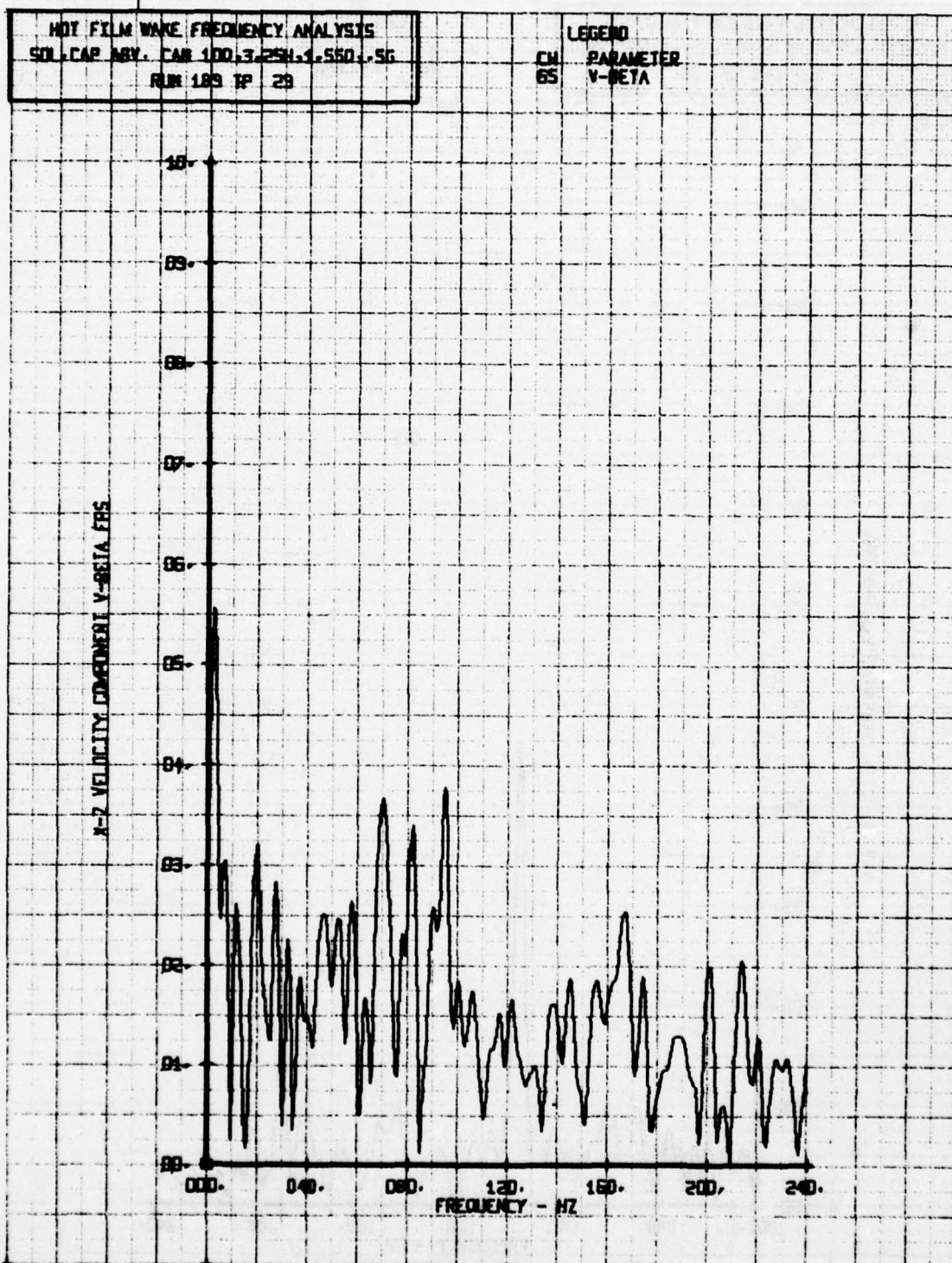


HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ABY. CAN 100.3.25H.1.55D.1.5G
RUN 189 TP 3B

LEGEND
CH. 66
PARAMETER
V-ALPHA

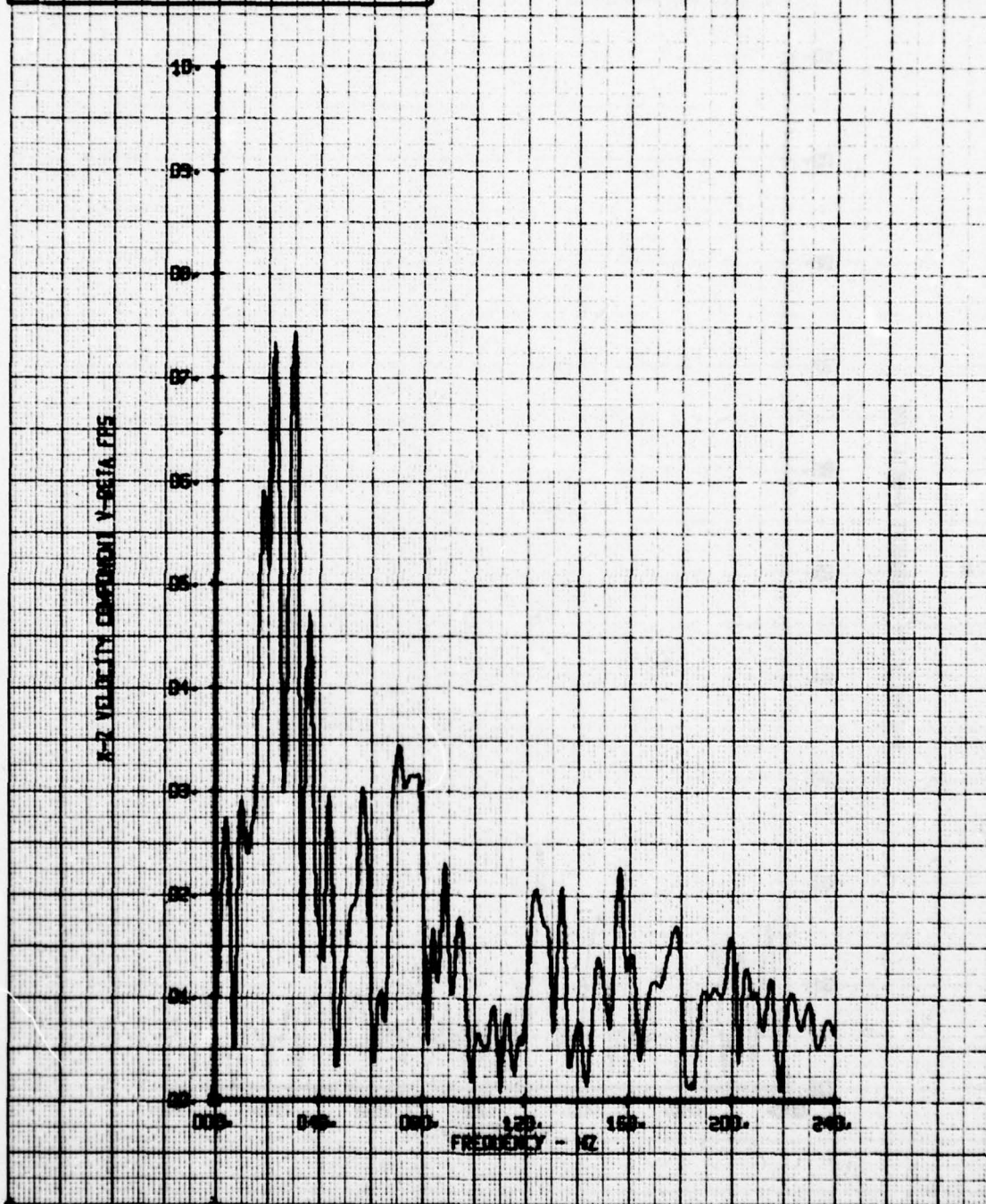






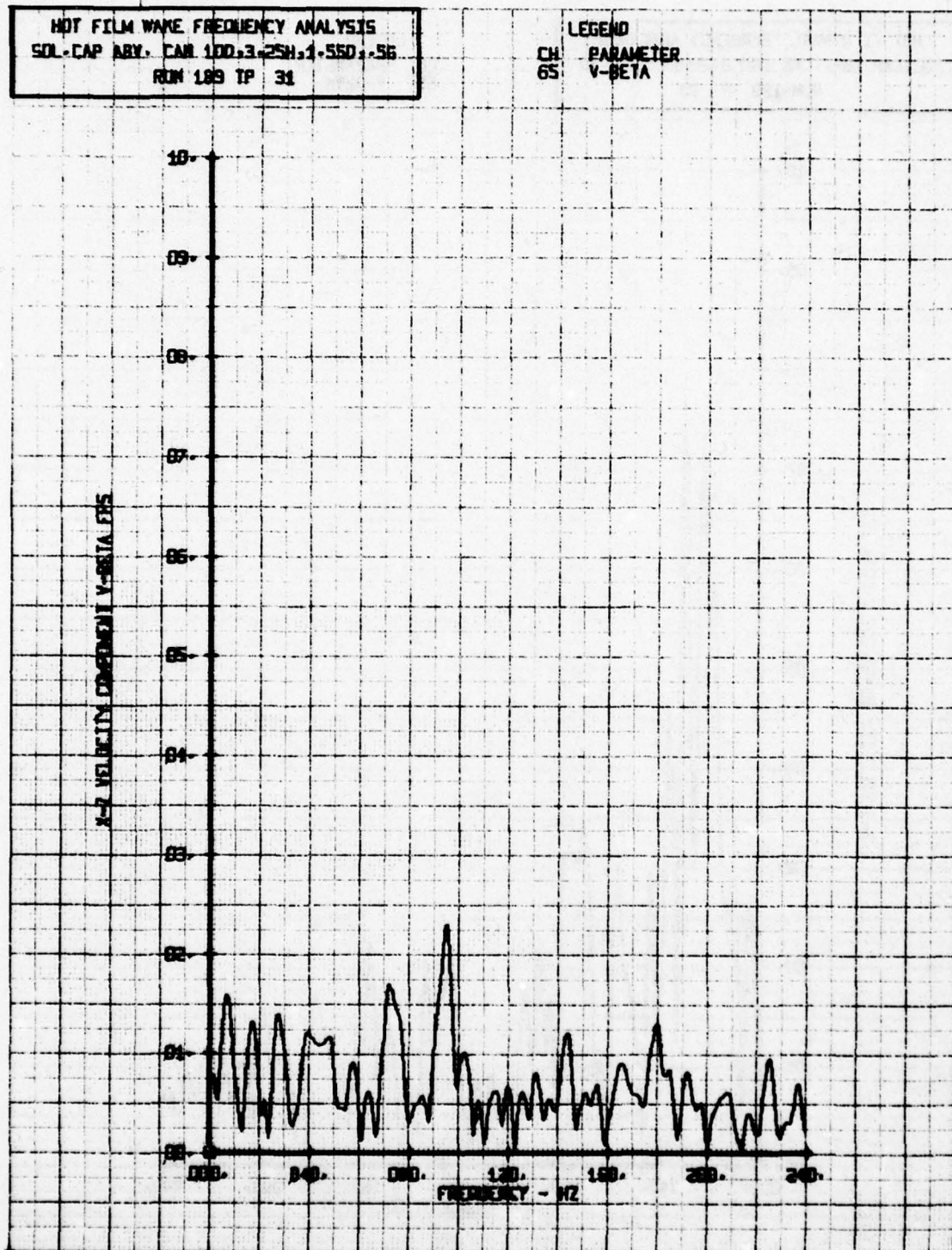
HOT FILM WAKE FREQUENCY ANALYSIS
 SOL. CAP. ABY. CAN 100.3-250.1-550.56
 RUN 188 TP 30

LEGEND
 CH 65 PARAMETER
 Y-BETA



HOT FILM WAKE FREQUENCY ANALYSIS
SOL-CAP ARY. CAR 100.3-25H.1-550.-56
ROM 189 TP 31

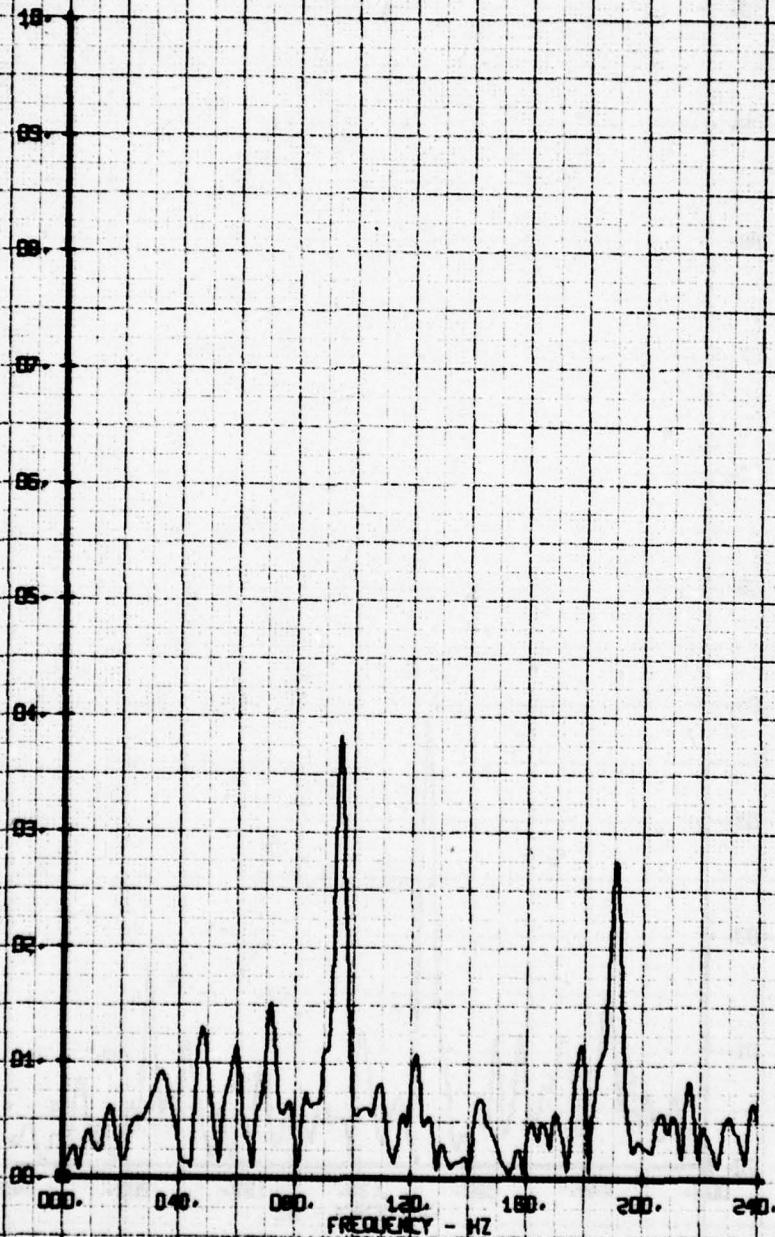
LEGEND
CH PARAMETER
65 V-BETA



HOT FILM WAKE FREQUENCY ANALYSIS
 SOL. CAP. ARY. CAR 100.3 25H.1.580.56
 RUN 185 TP 32

LEGEND
 CH PARAMETER
 65 V-BETA

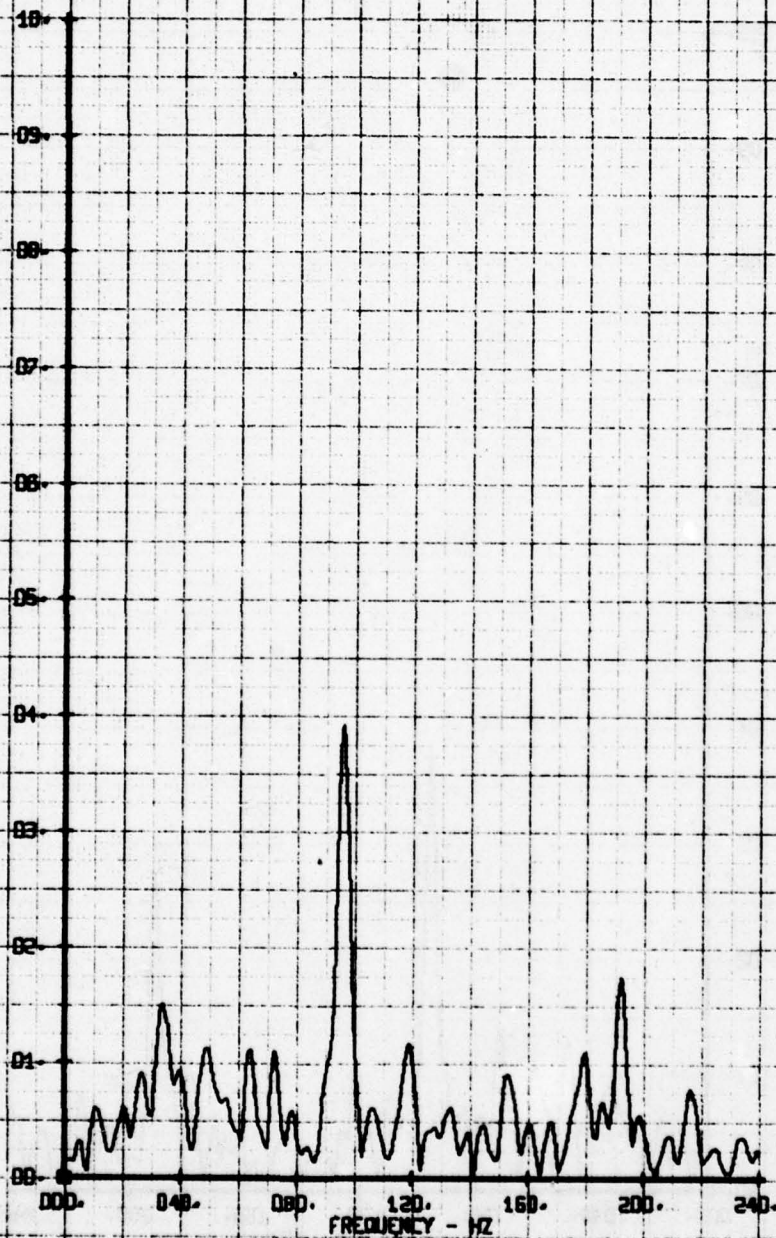
X-2 VELOCITY COMPONENT V-BETA.FHS



HOT FILM WAKE FREQUENCY ANALYSIS
SOL CAP ARY. CAN 100.3.25M.1.550.56
RUN 188 TP 33

LEGEND
CH PARAMETER
65 Y-BETA

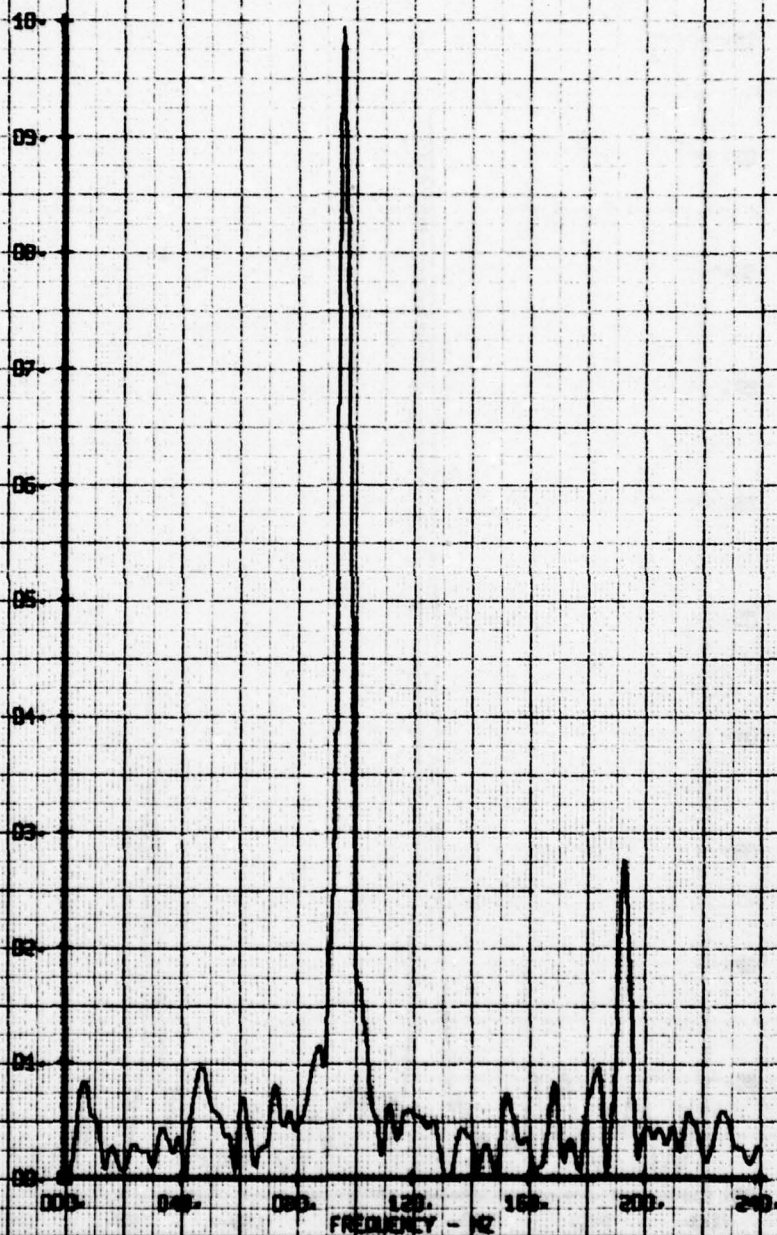
X-2 VELOCITY COMPONENT Y-BETA FHS



NOT FILM WAVE FREQUENCY ANALYSIS
SOL. CAP. ARV. CAN 100.3-25M.1-550.56
RUN 188 TP 34

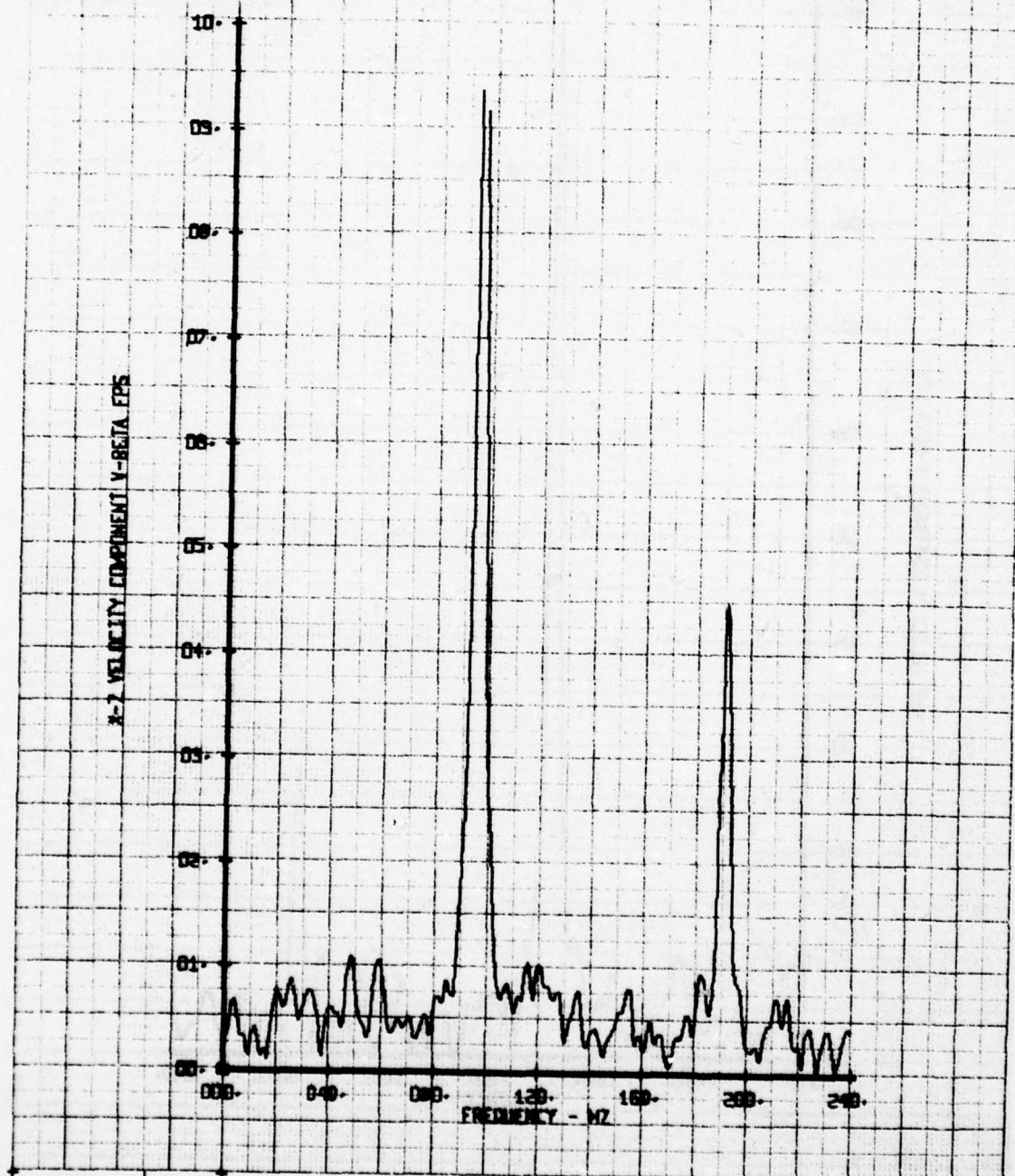
LEGEND
CH 65
PARAMETER
V-PETA

X-2 VELOCITY COMPONENT V-PETA FFS



HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ABY. CAP 100.3-25H.1-550.5G
RUN 189 TP 35

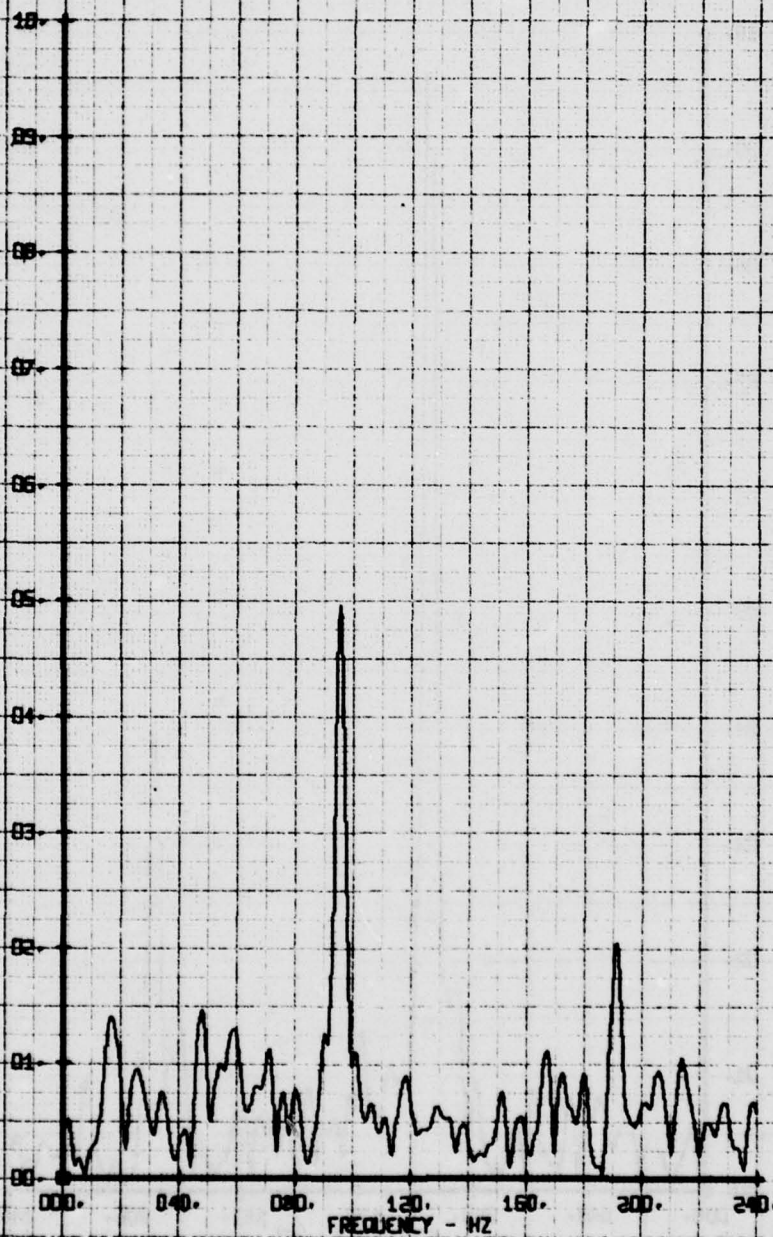
LEGEND
CH: PARAMETER
65: V-BETA

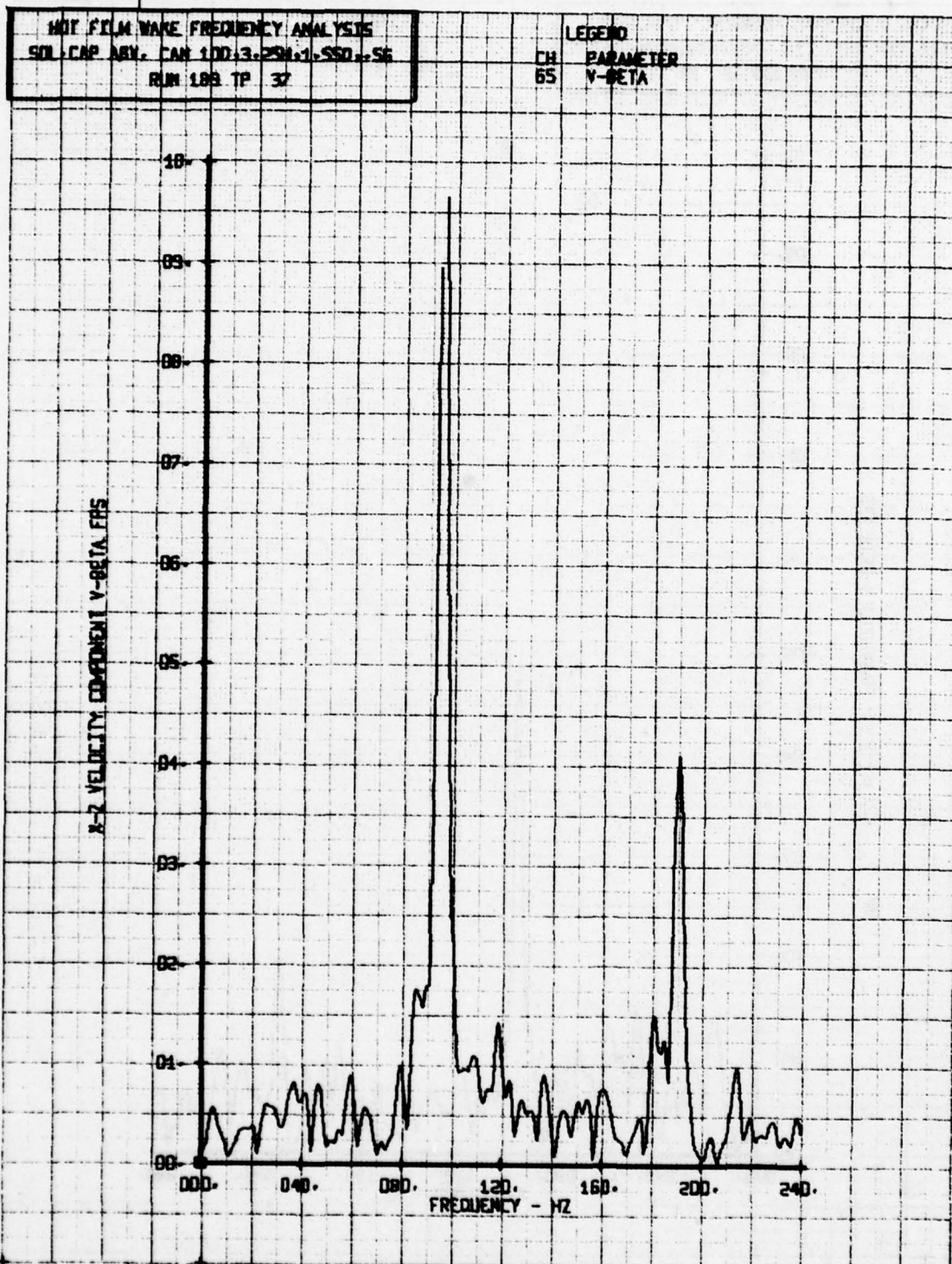


HOT FILM WAKE FREQUENCY ANALYSIS
SOL-CAP ABY. CAN 100.3.25H.1-550..96
RUN 189 TP 36

LEGEND
CH 65
PARAMETER
V-BETA

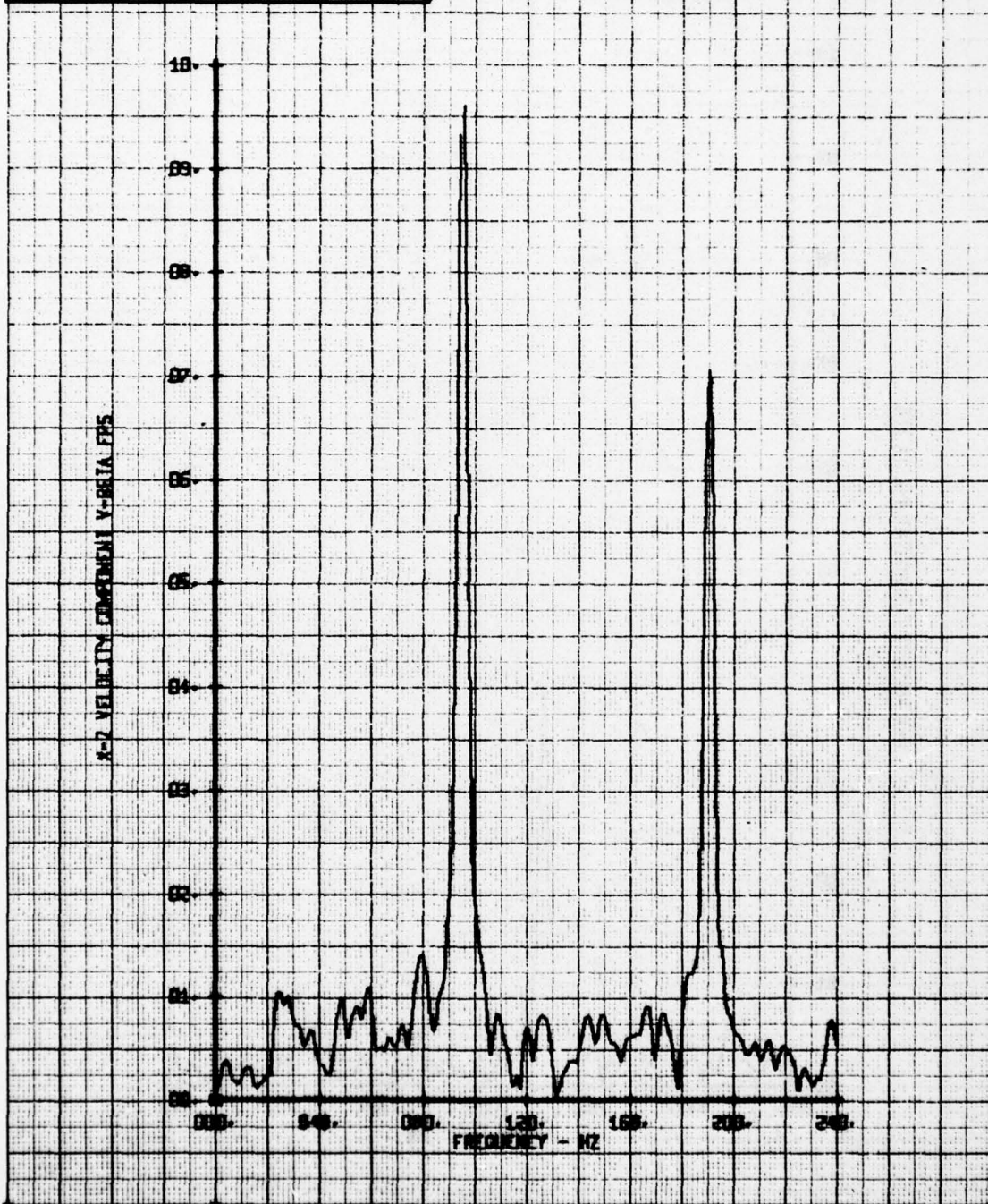
X-2 VELOCITY COMPONENT V-BETA EPS





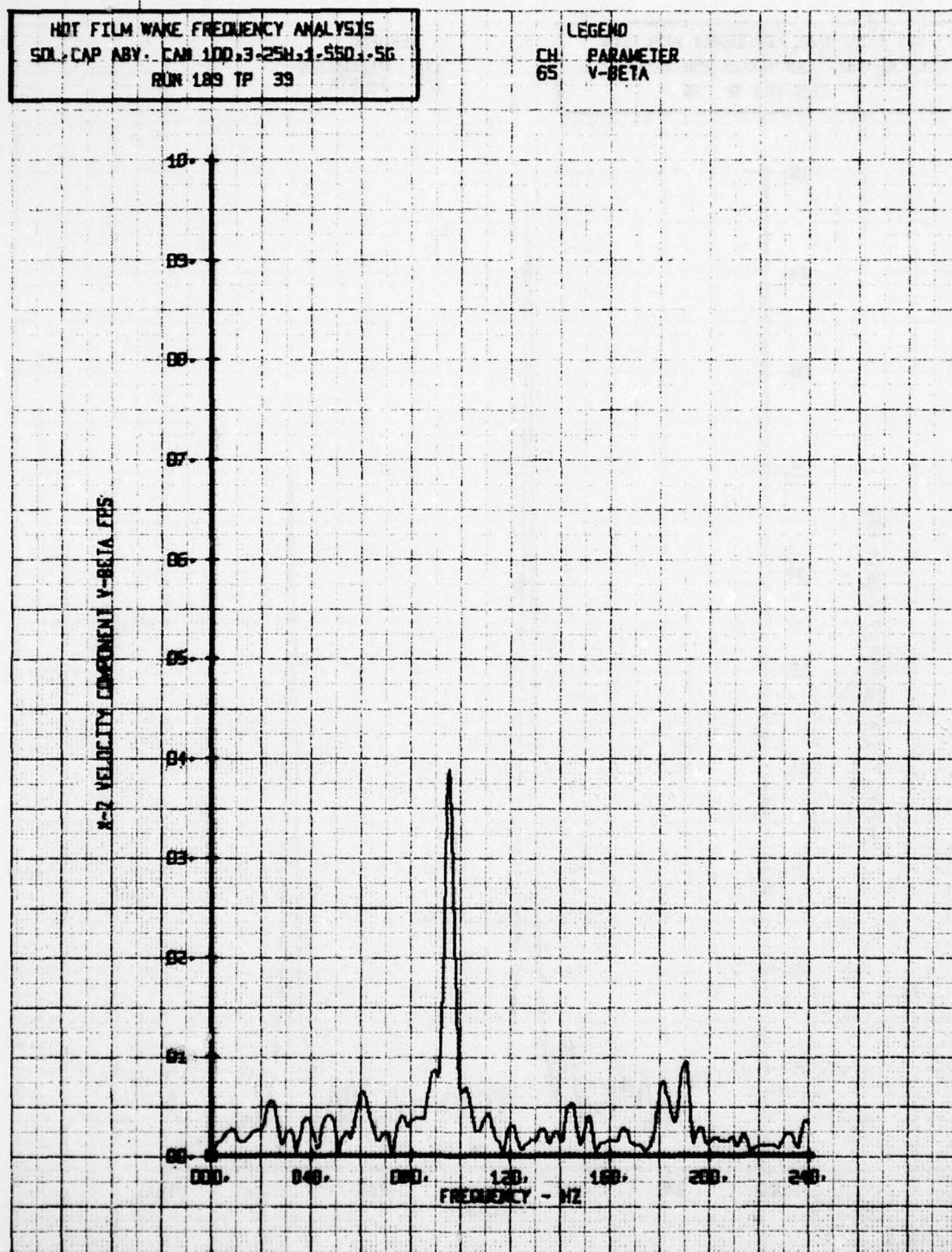
HOT FILM WAKE FREQUENCY ANALYSIS
 SOL. CAP. ARY. CAN 100.3-25H.1-550.5G
 RUN 189 TP 38

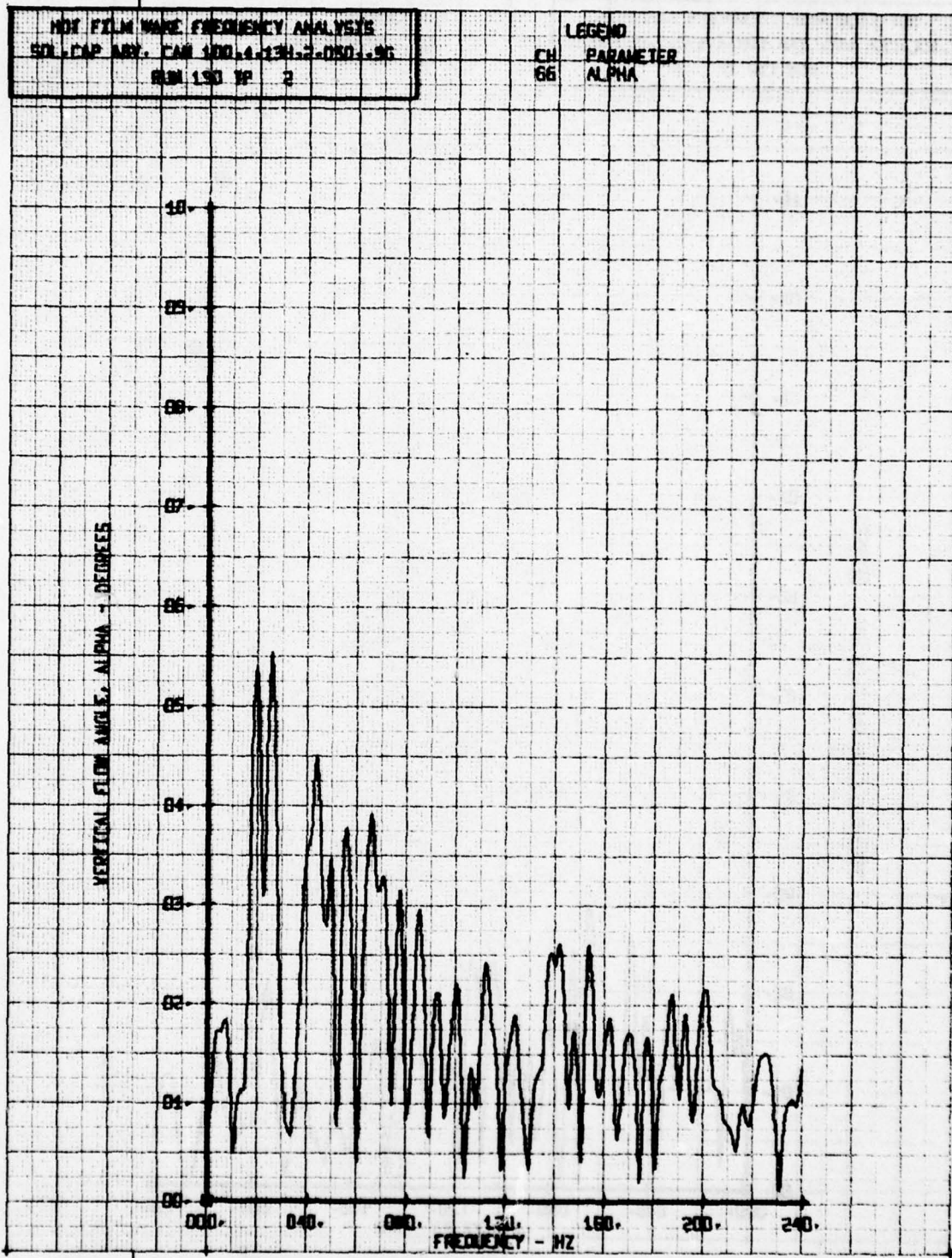
LEGEND
 CH 65
 PARAMETER
 V-BETA



HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ABY. CAM 100.3-25H.1-550.-5G
RUN 189 TP 39

LEGEND
CH 65 PARAMETER
V-BETA

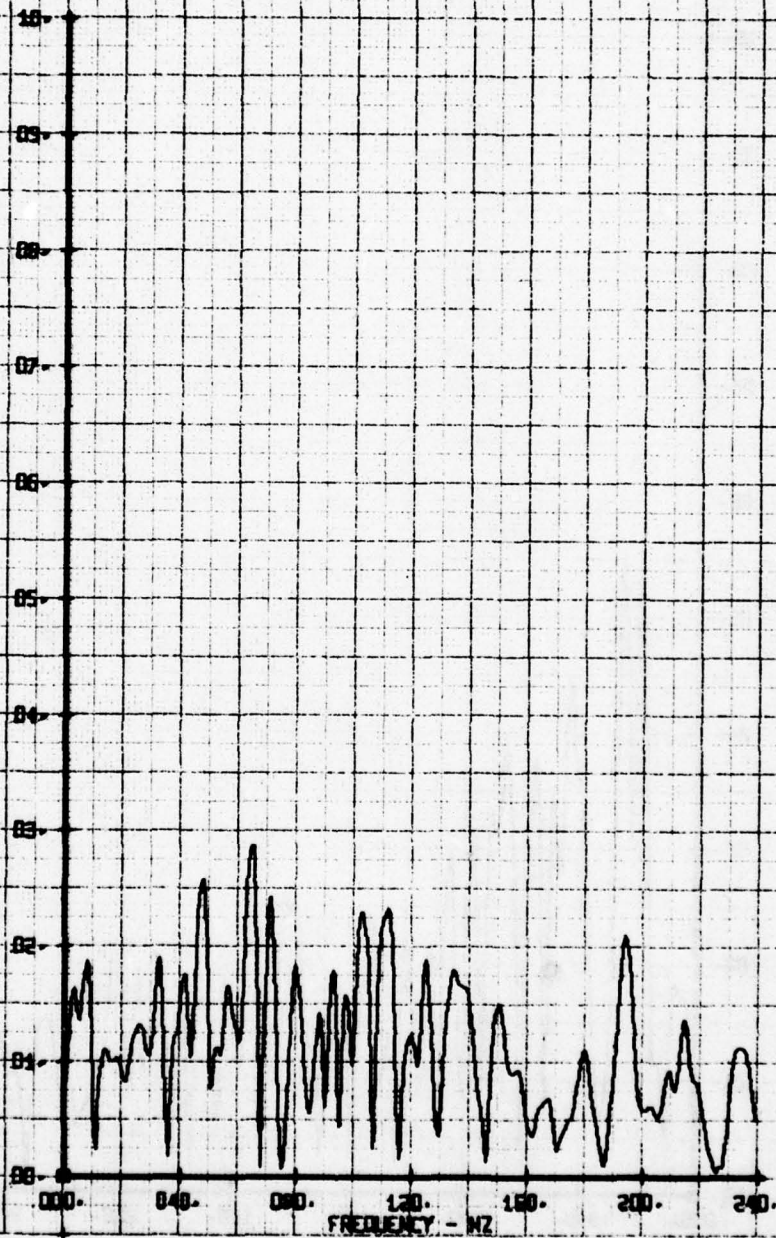




HOT FILM WAVE FREQUENCY ANALYSIS
STL CAP ARR. CAN 100.4.134.2.050.95
RUN 150 TP 3

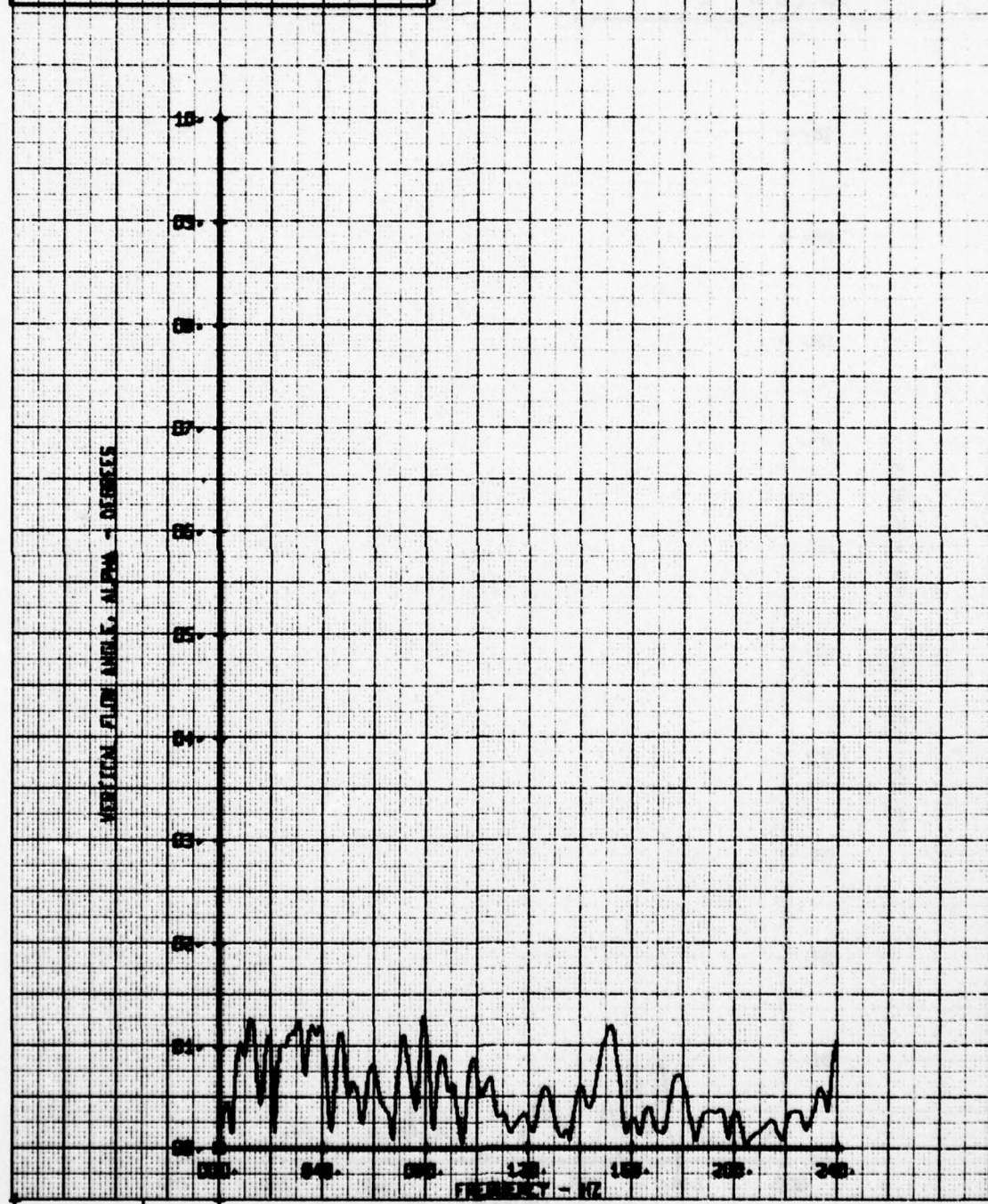
LEGEND
CH 66
PARAMETER
ALPHA

VERTICAL FLOW ANGLE α - DEGREES



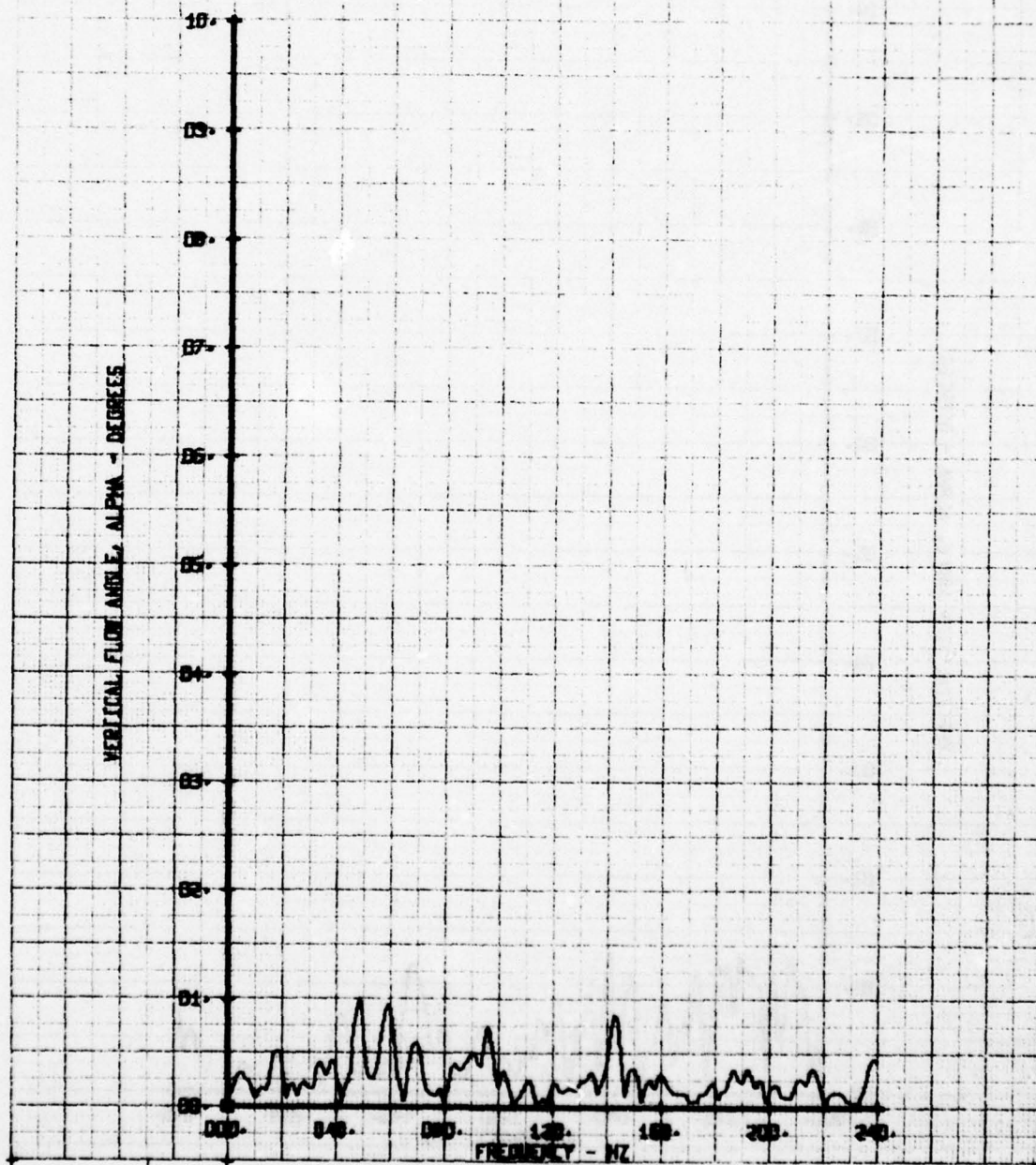
HOT FILM WAVE FREQUENCY ANALYSIS
SOL-CAP ARV. CAN 100-4-13N-2-050-96
R0N 130 TP 4

LEGEND
CH 66 PARAMETER
ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ABY. CAN 100.4-13H.2-050.0-96
RUN 130 TP 5

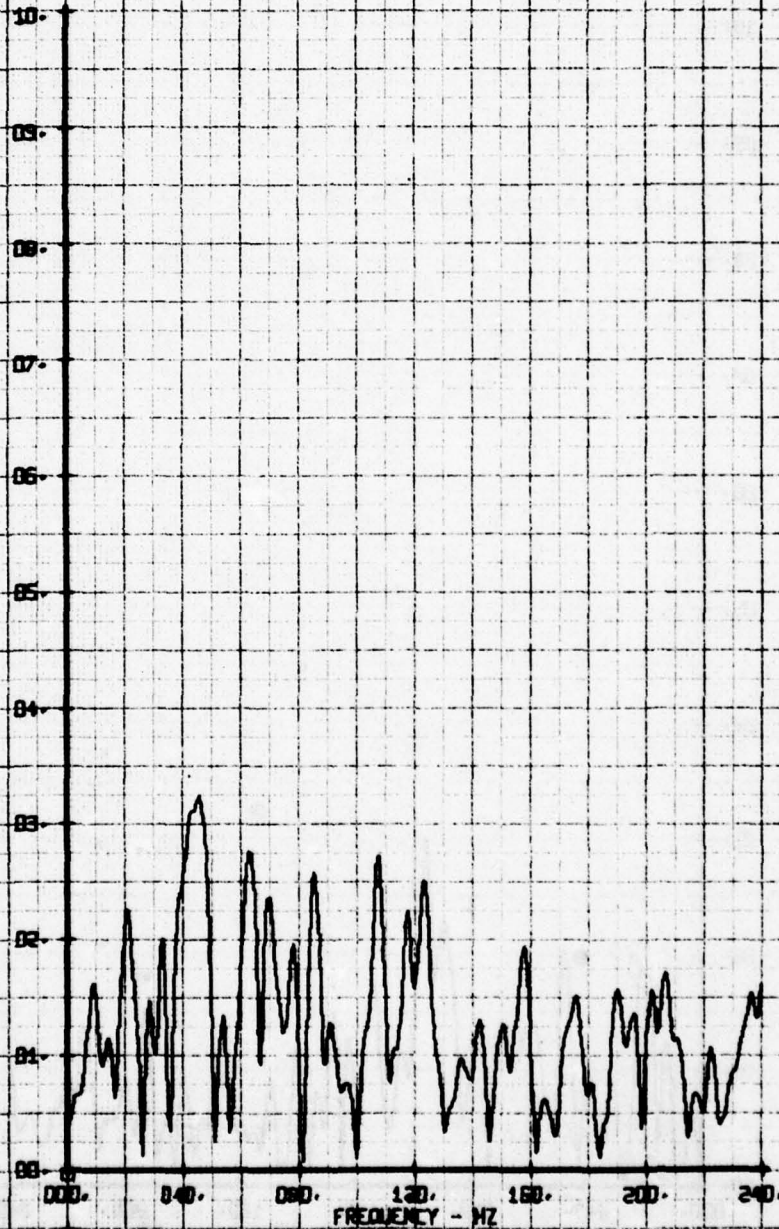
LEGEND
CH 66 PARAMETER
ALPHA



NOY FILM WAVE FREQUENCY ANALYSIS
SOL. CAP. ARY. CAM 100.4.134.2.050.96
RUN 150 TP 2

LEGEND
CH PARAMETER
05 BETA

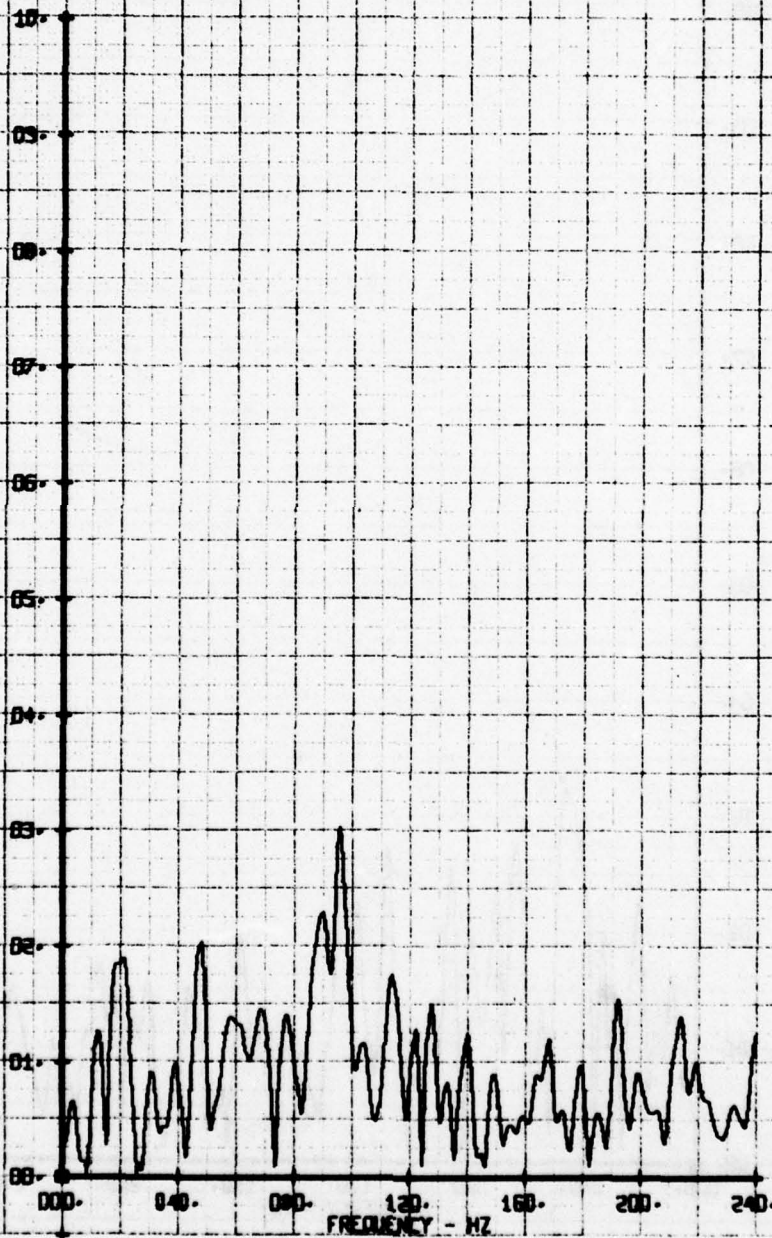
LATERAL FLOW ANGLE, BETA - DEGREES



ROT FILM WAVE FREQUENCY ANALYSIS
SOL CAP ABV. CAP 100.4-134.2-050.96
RUN 130 TP 3

LEGEND
CH. PARAMETER
65 BETA

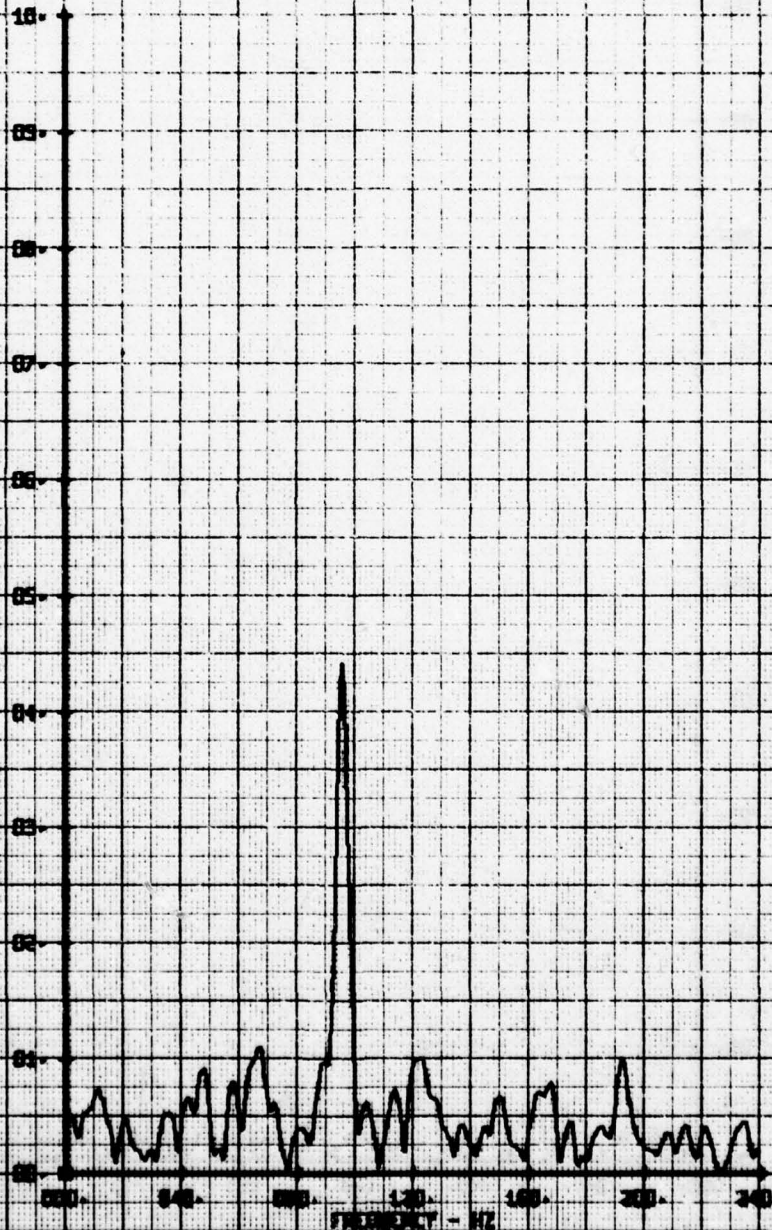
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WIRE FREQUENCY ANALYSIS
SOL. CAP. ARY. CAN 100.4-13H.2.05D..90
RUN 190 TP 4

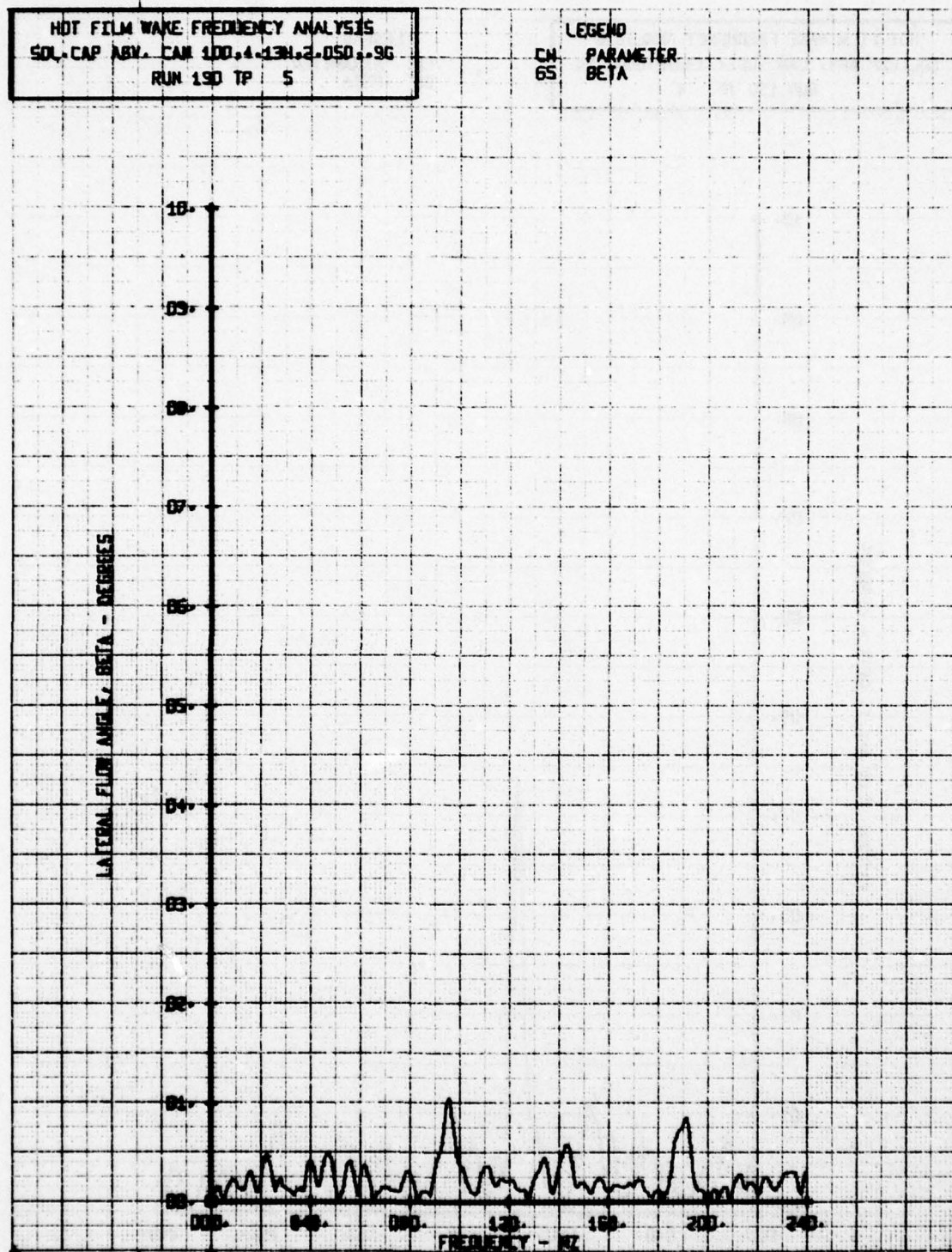
LEGEND
CN 65
PARAMETER
BETA

LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ABV. CAN 100.4-13N.2-050.-96
RUN 190 TP 5

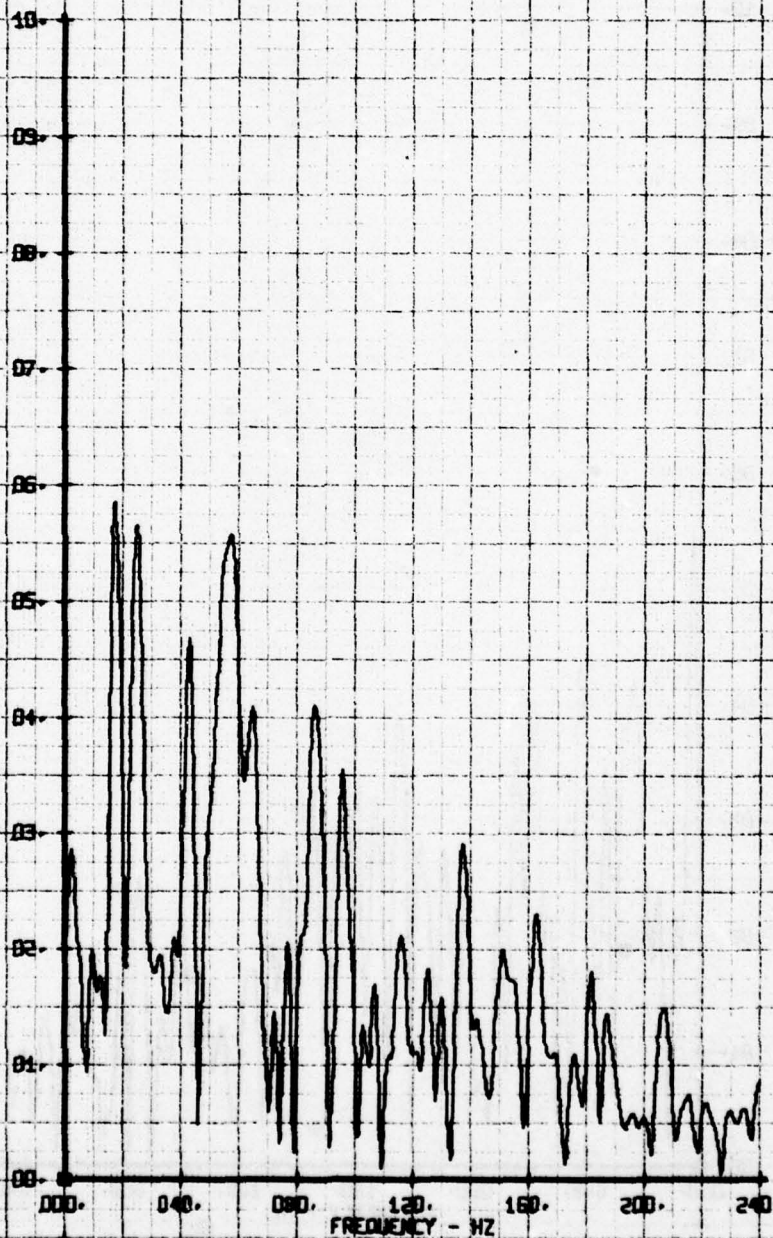
LEGEND
CM
65
PARAMETER
BETA



HOT FILM WAKE FREQUENCY ANALYSIS
SOL CAP ARY. CAN 100.4.13H.2.050.96
RUN 150 TP 2

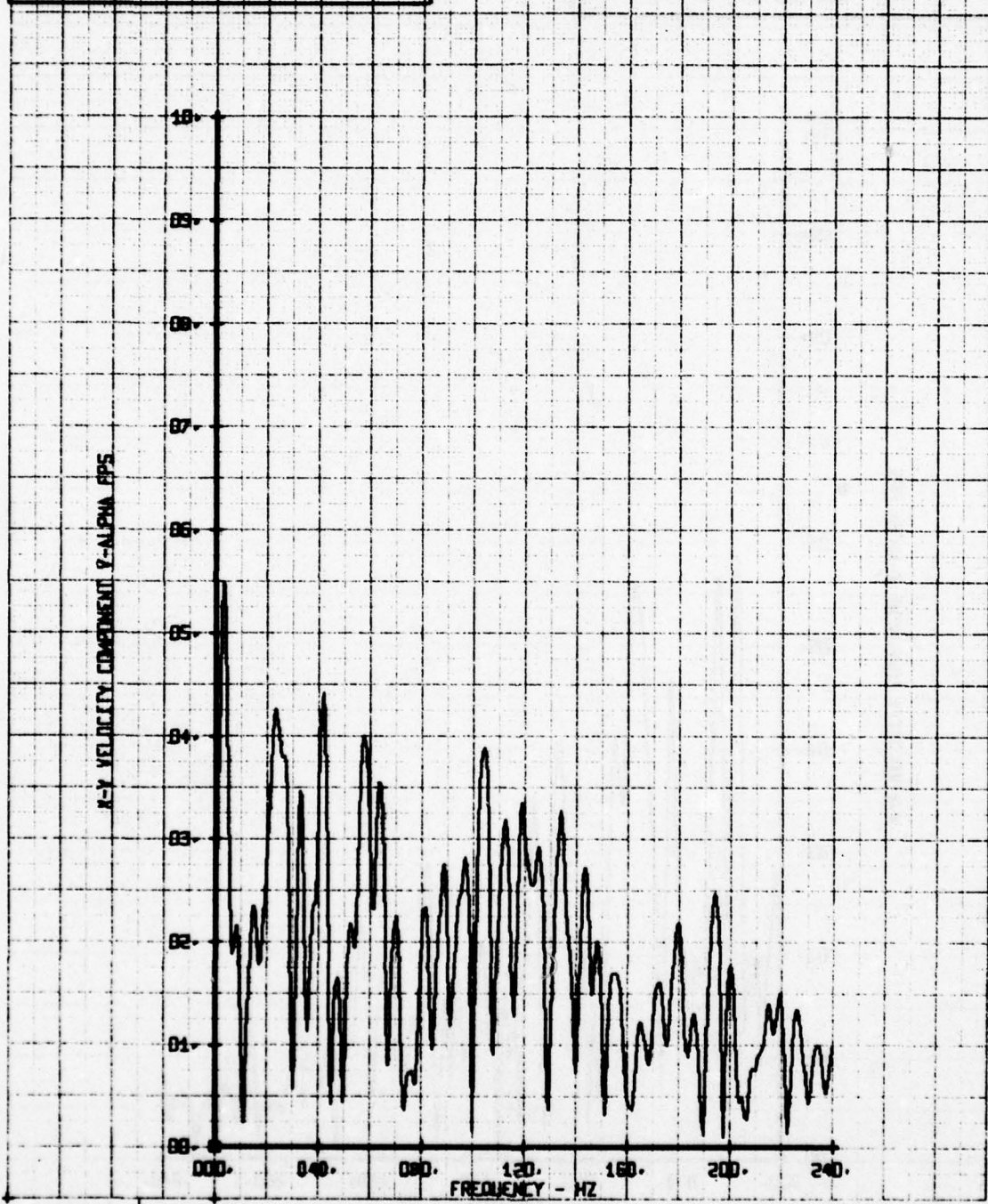
LEGEND
CH 66 PARAMETER
V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



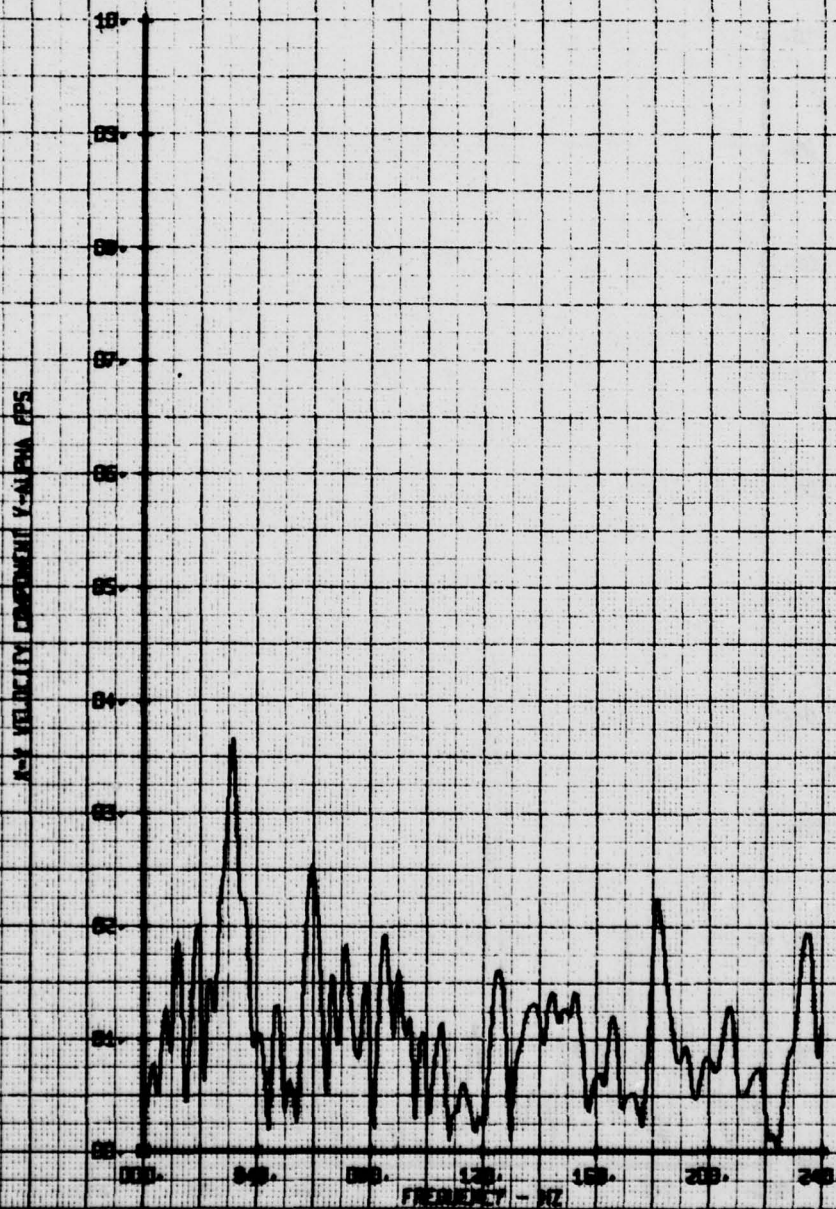
HOT FILM WAKE FREQUENCY ANALYSIS
SOL CAP AVE. CAN 100.4.134.2.050.96
RUN 150 TP 3

LEGEND
CH 66
PARAMETER
V-ALPHA



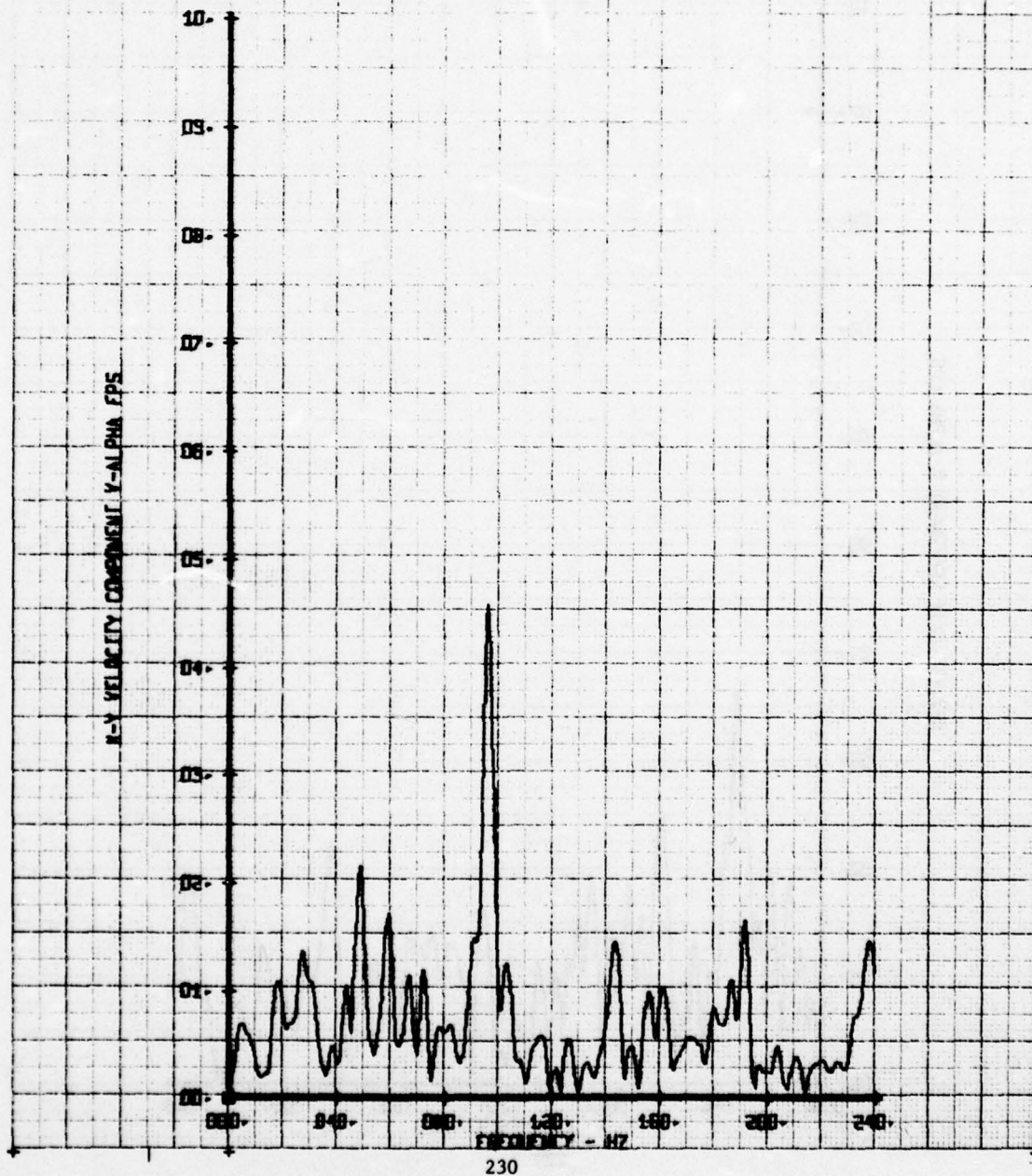
HDT FILM WAVE FREQUENCY ANALYSIS
SOL. CAP. ARY. CAR 100.4-134.2-050-.96
RUN 150 TP 4

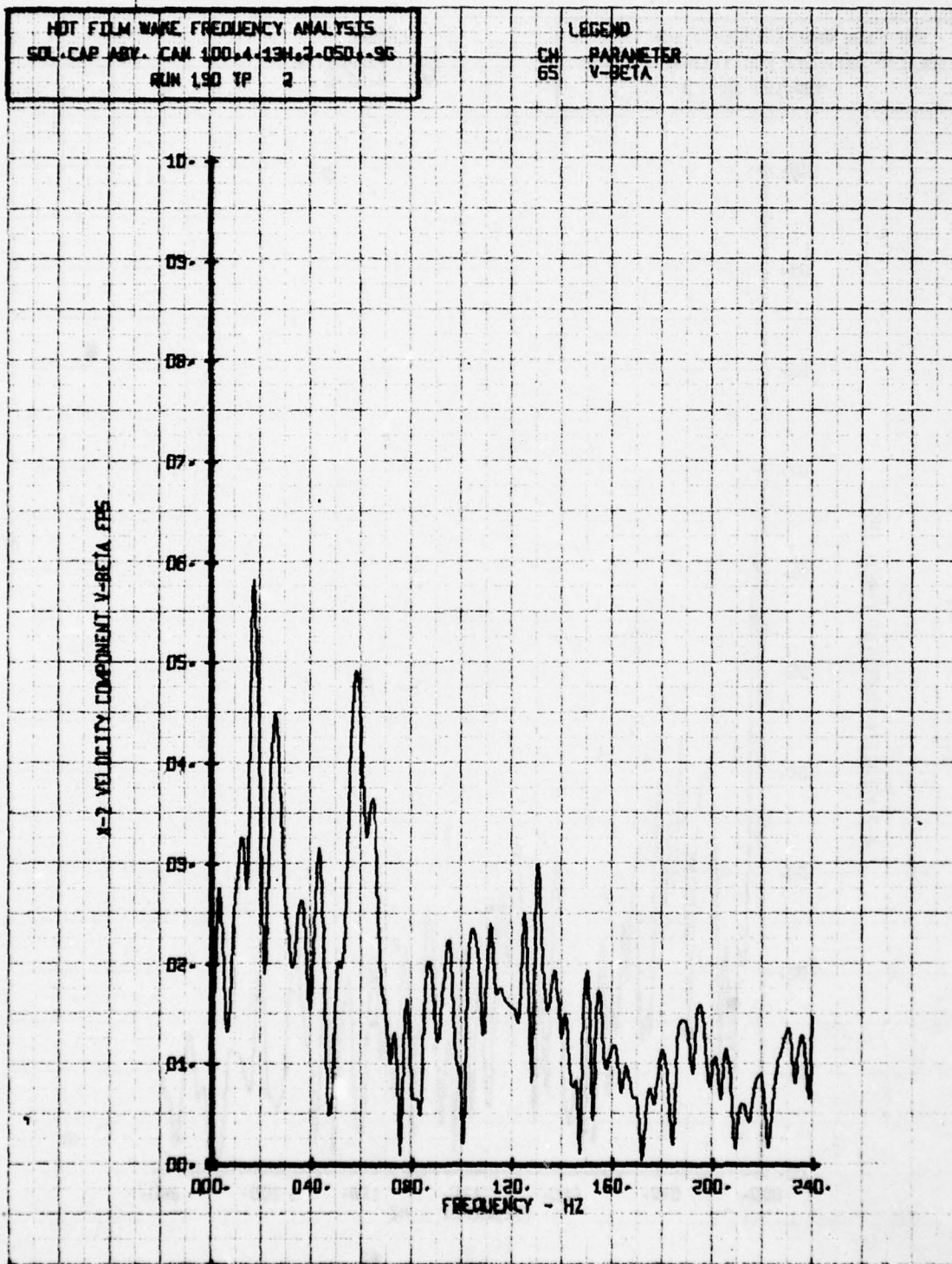
LEGEND
CH PARAMETER
66 V-ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
SBL-CAP ABV. CAN 100-4-13H-2-050-9G
RUR 190 TP 5

LEGEND
CH PARAMETER
66 V-ALPHA

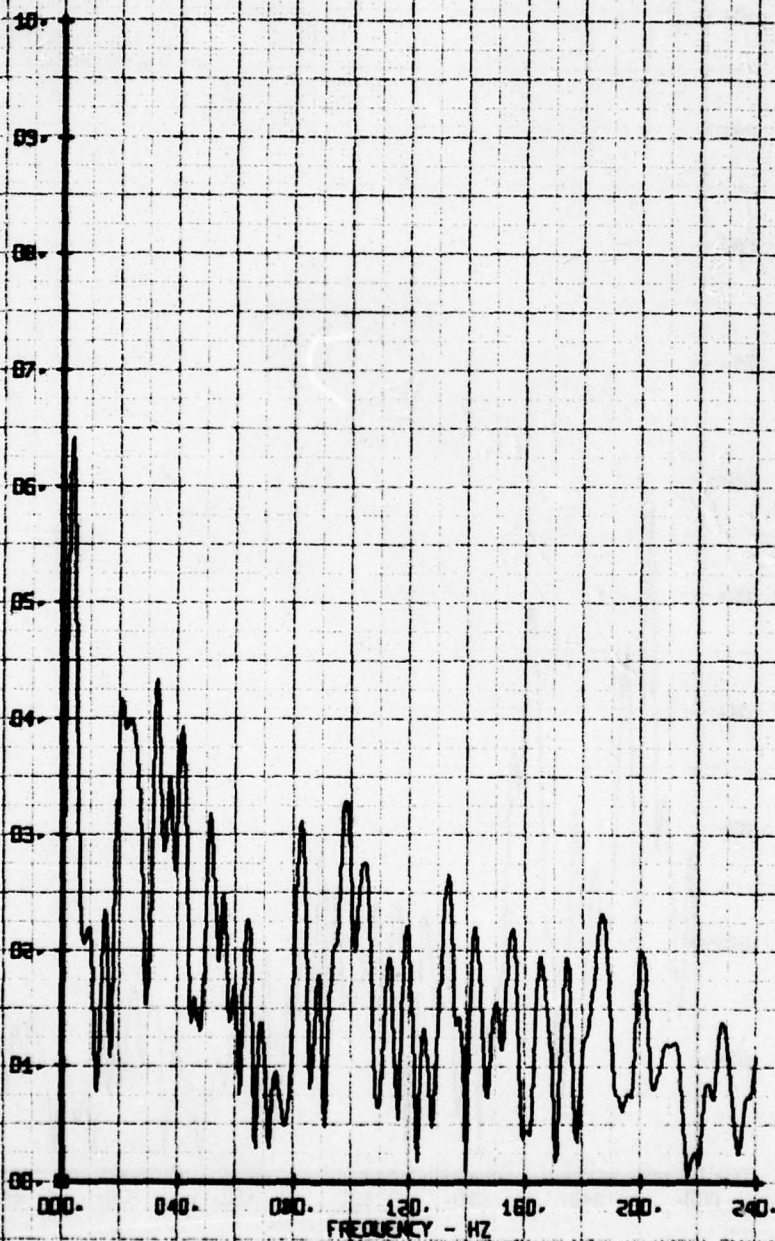




HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ARY. CAN 100.4.134.2.050.96
RUN 150 TP 3

LEGEND
CH. 65
PARAMETER
V-BETA

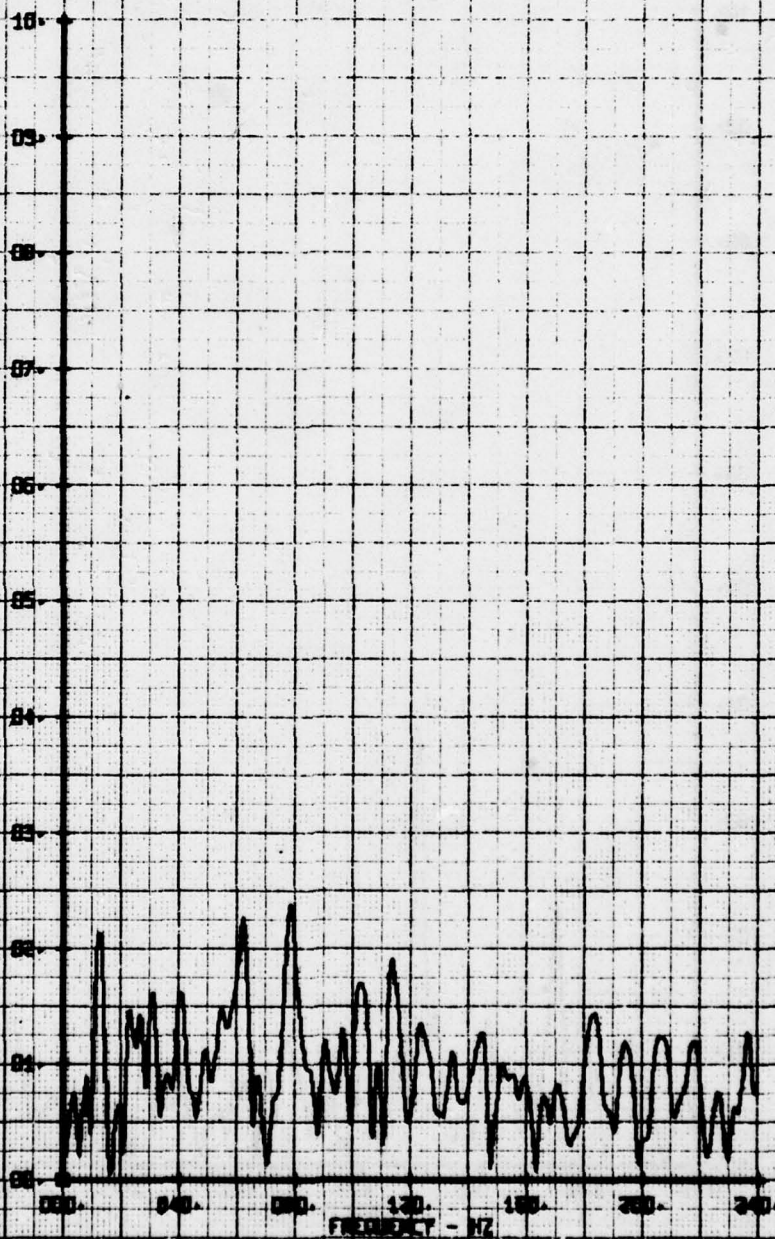
A-2 VELOCITY COEFFICIENT V-BETA, FPS



HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ARY. CAR. 100.4 13H.2.050.90
RUN 130 TP 4

LEGEND
CH 65 PARAMETER
V-BETA

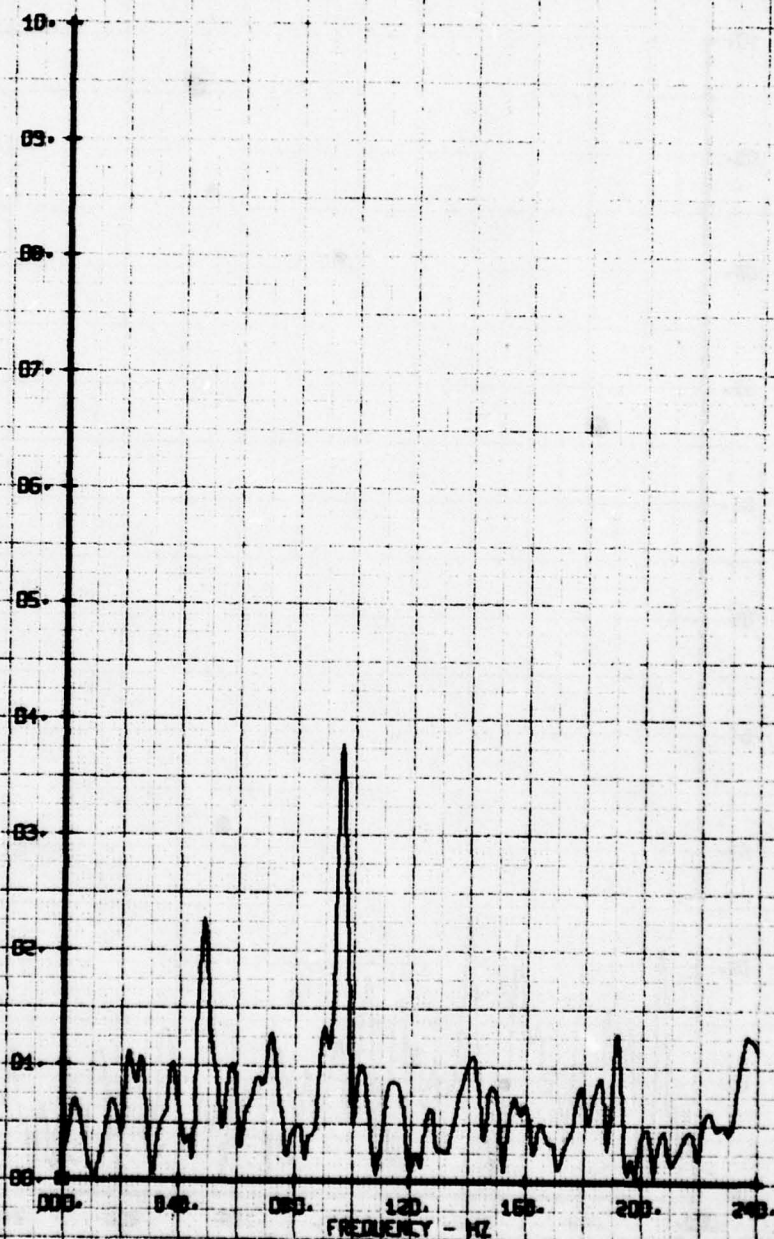
N-2 VELOCITY COMPONENT V-BETA FBS



HOT FILM WAVE FREQUENCY ANALYSIS
SOL. CAP. ABY. CAN 100.4-13M.2-050.1-96
RUN 1SD TP 5

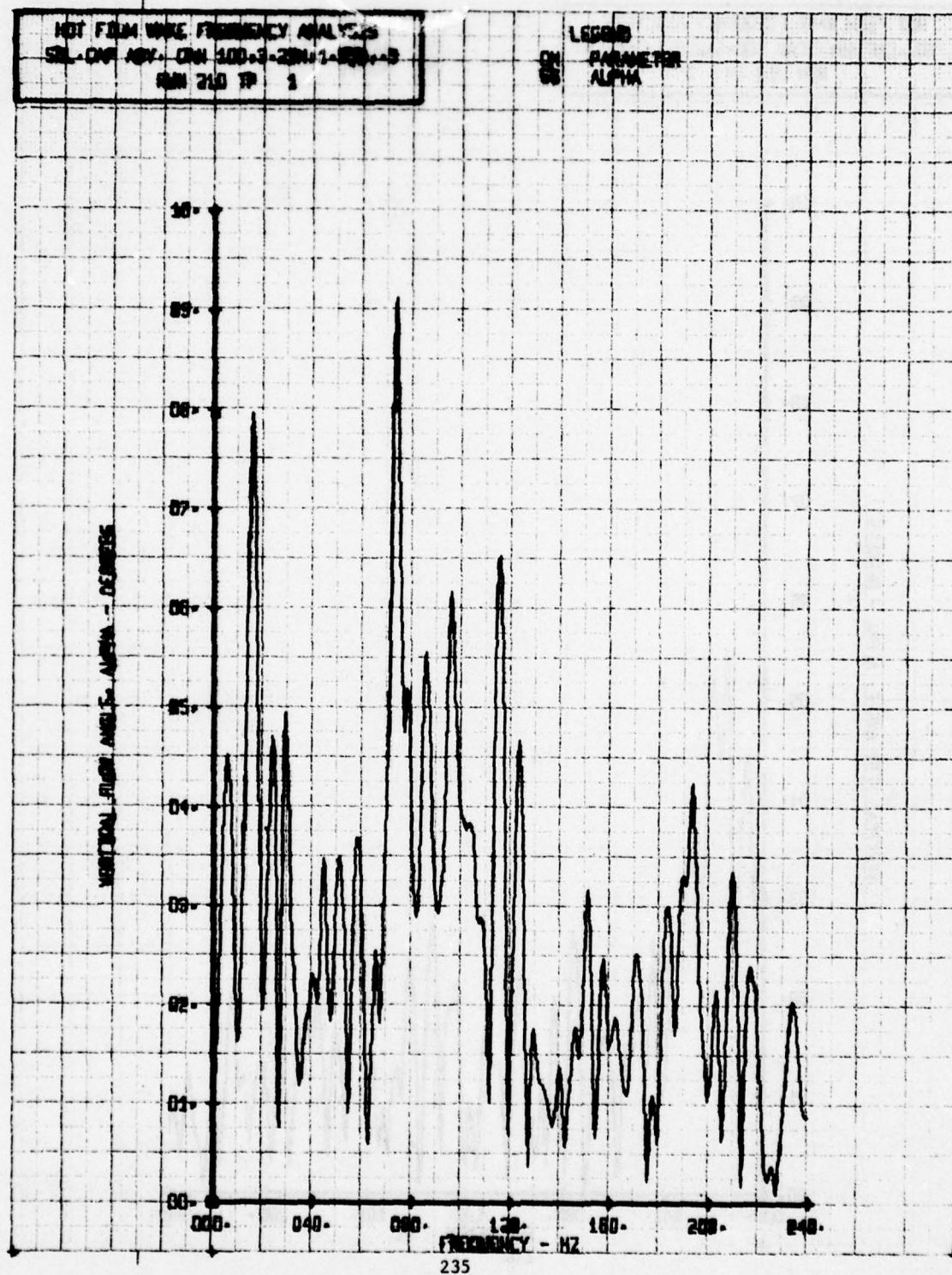
LEGEND
CH 65
PARAMETER
V-BETA

X-Z VELOCITY COMPONENT V-BETA FTS



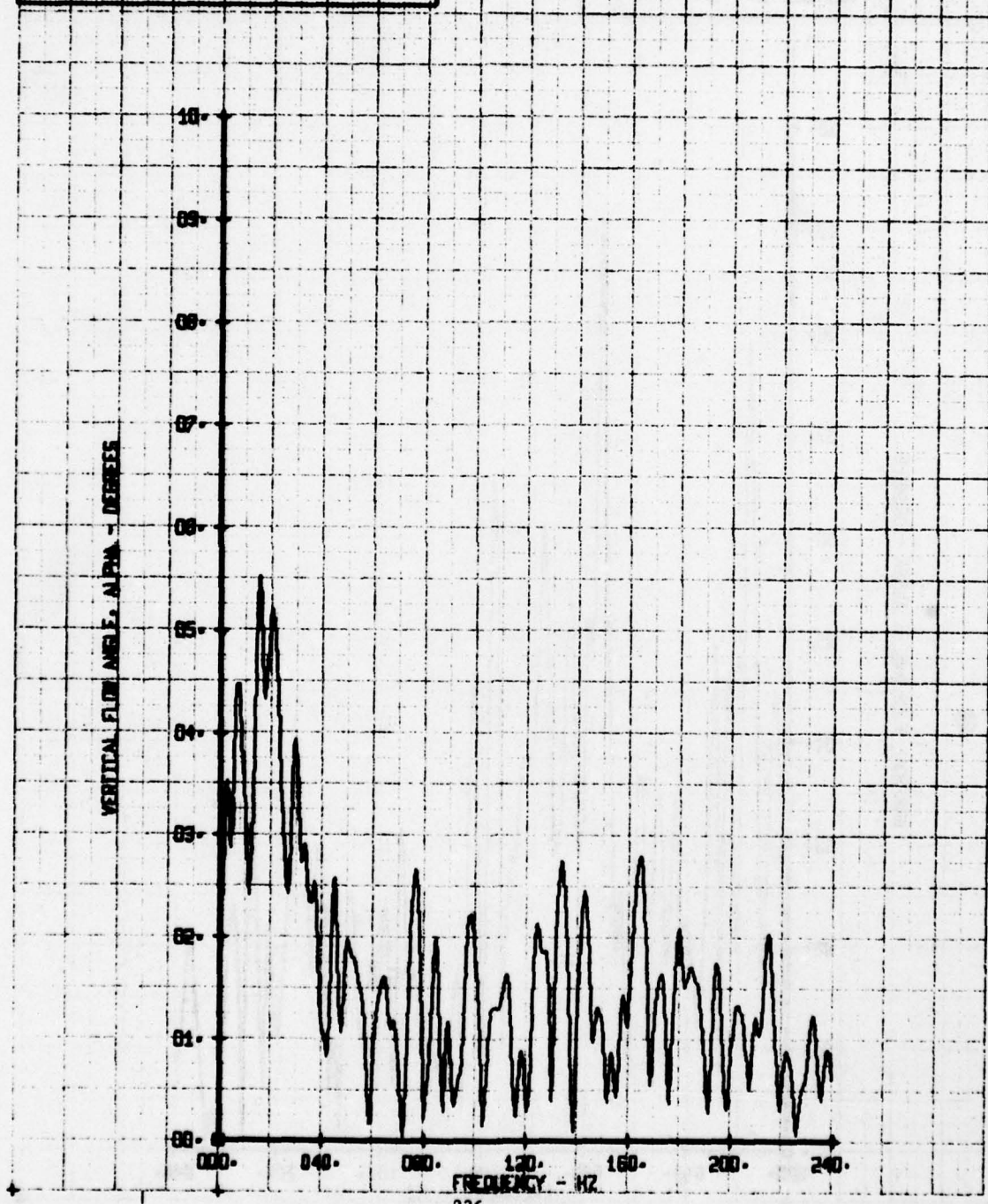
HOT FILM WIRE FREQUENCY ANALYSIS
SIL-CAP ADV-CRM 100-3-20N-1-000-0
R01 210 TP 1

LEGEND
ON
OFF
PARAMETER
ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ADV. CAN 100-3-25N-1-550-5
RUN 210 TP 2

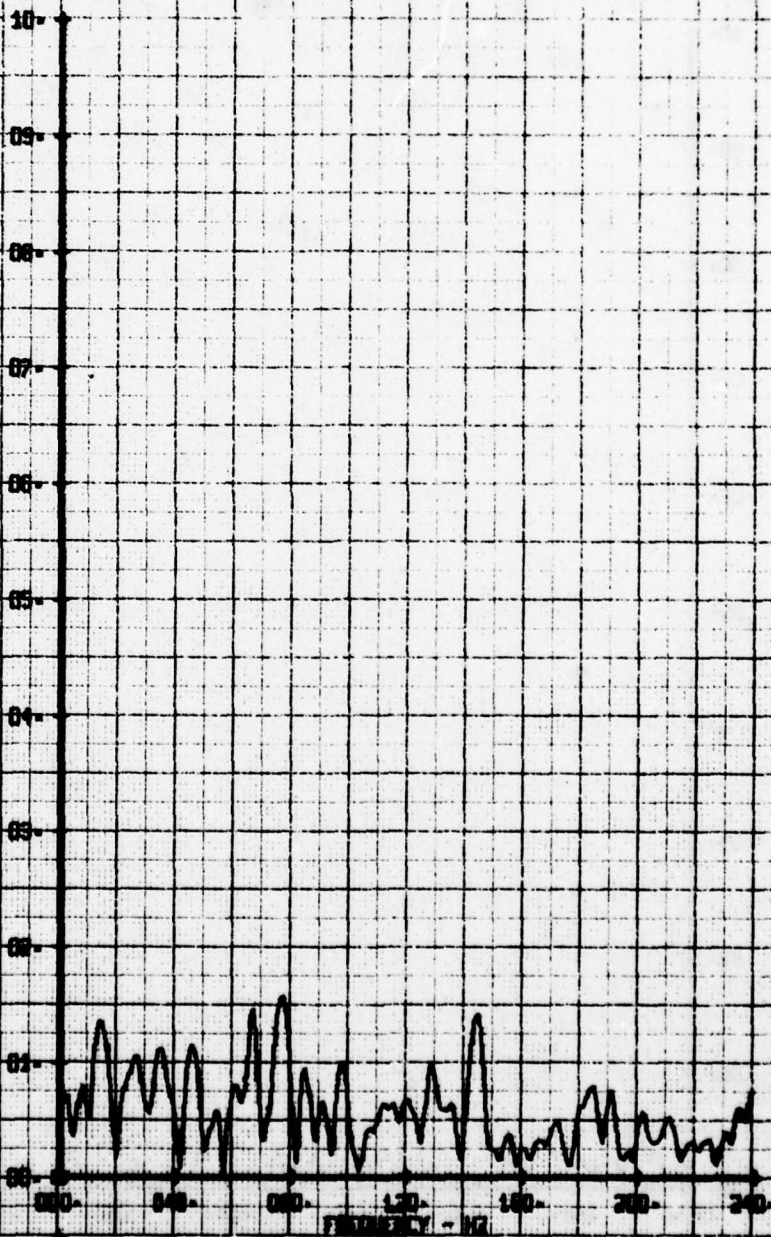
LEGEND
CH 66
PARAMETER
ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
SOL-CAP ADV. CAN 100-3-25H-1-550-5
RUN 240 TP 3

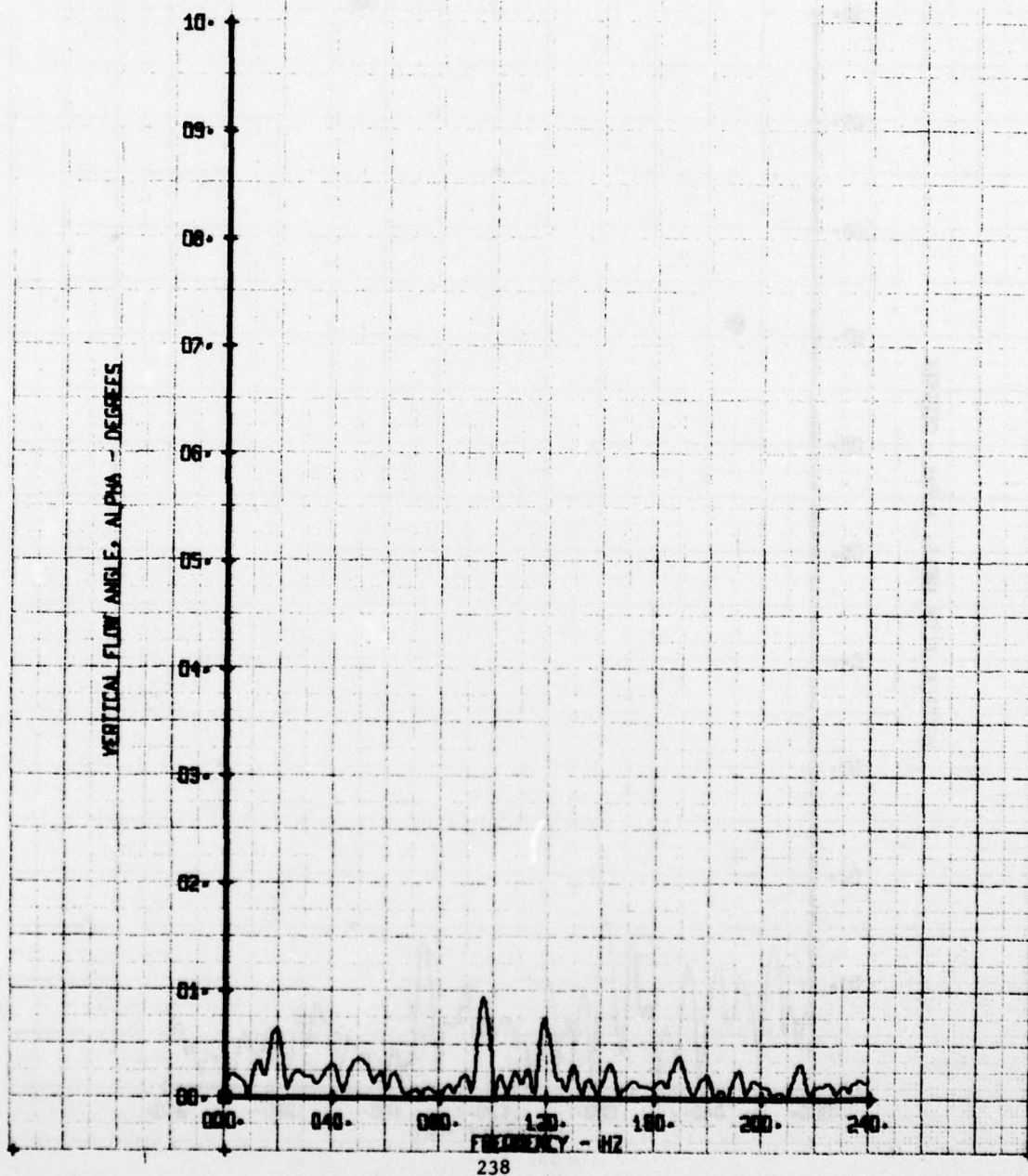
LEGEND
CH. 06: PARAMETER
ALPHA

WAKE FLOW ANGLE, ALPHA - DEGREES



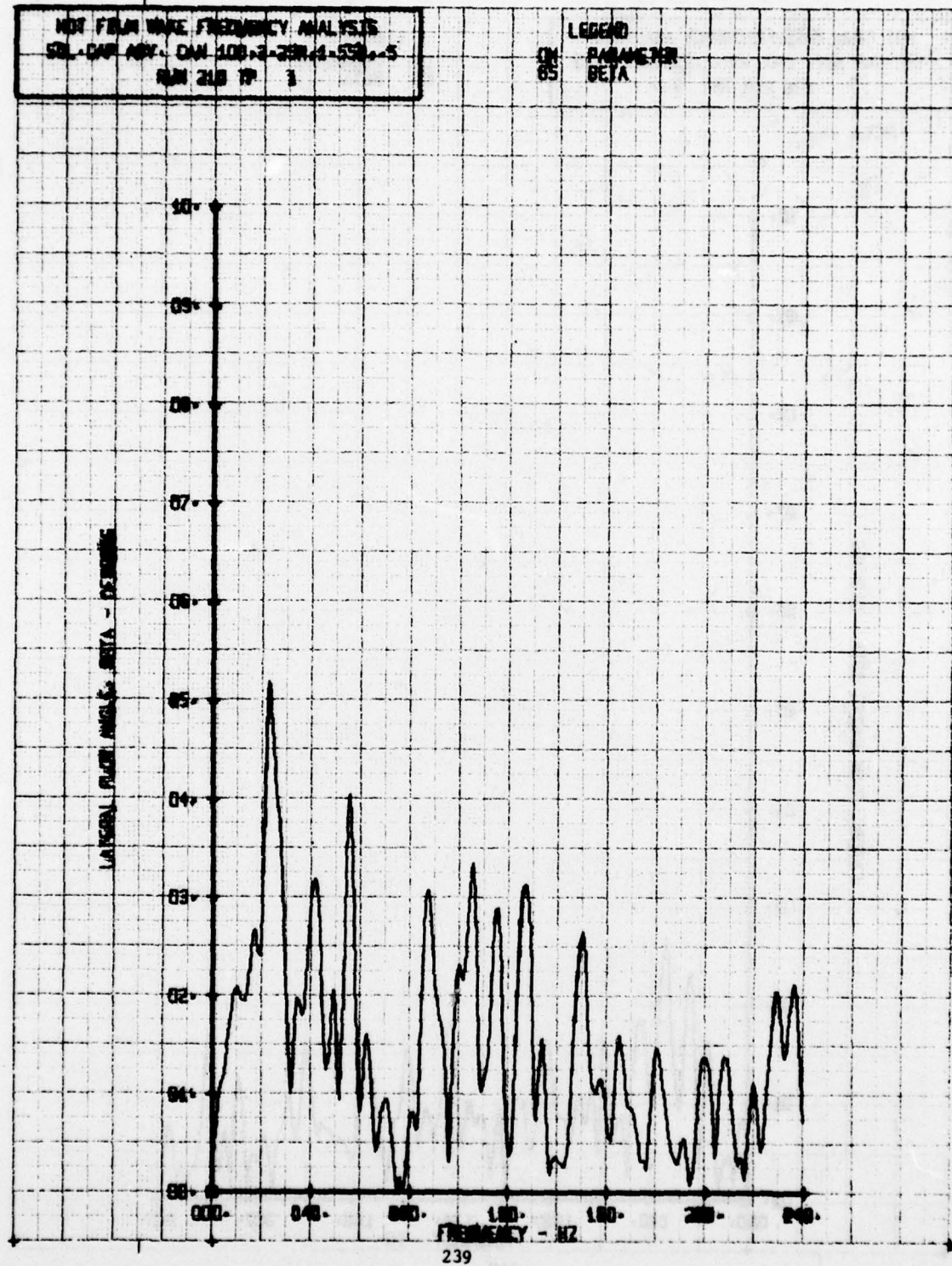
HOT FILM WAKE FREQUENCY ANALYSIS
SOL-CAP ADV. CAN 100,3-25H,1-550,-.5
RUN 210 TP 4

LEGEND
CH 66 PARAMETER
66 ALPHA



NOT FILM WAVE FREQUENCY ANALYSIS
SBL-DAP ADV. DAN 100-2-25N-1-550-5
RAN 210 1P 1

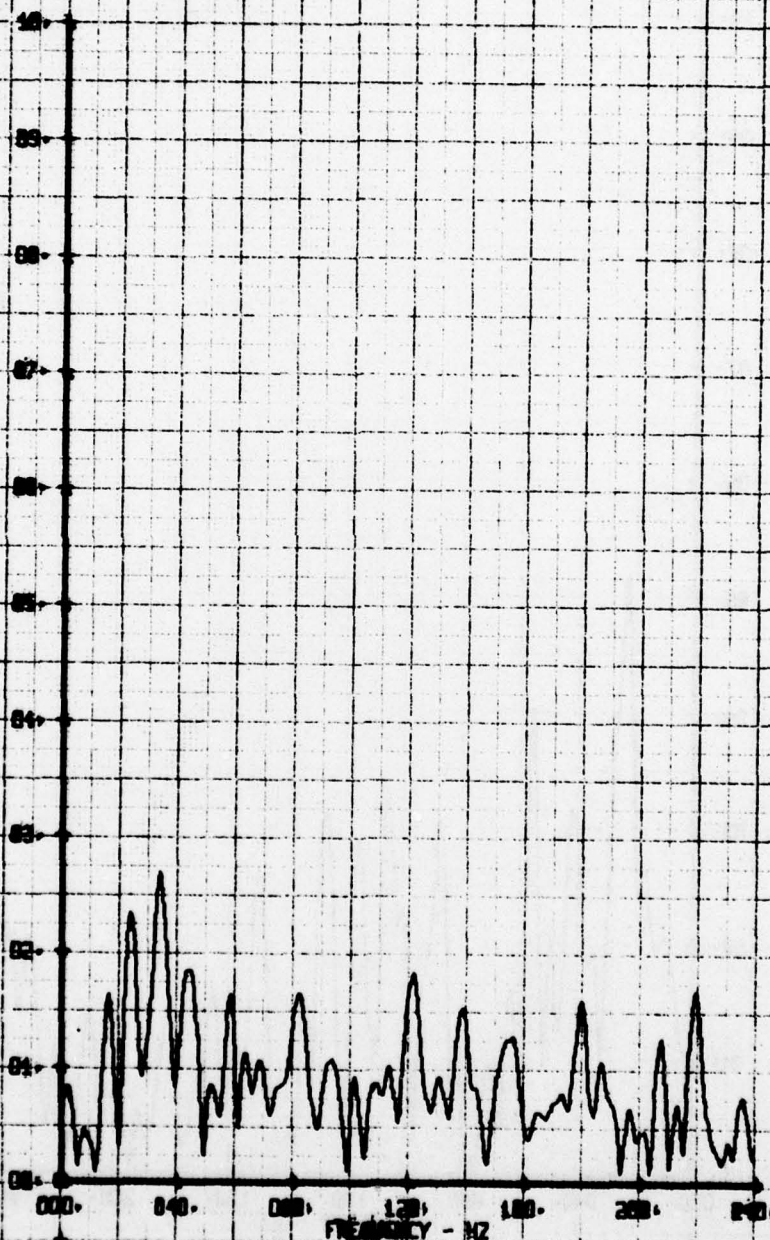
LEGEND
ON PARAMETER
05 BETA



NOI FROM WAVE FREQUENCY ANALYSIS
 SN .000 100. 000 100. 1.200 1.500 1.5
 RUN 210 TP 2

LEGEND
 ON PARAMETER
 05 051A

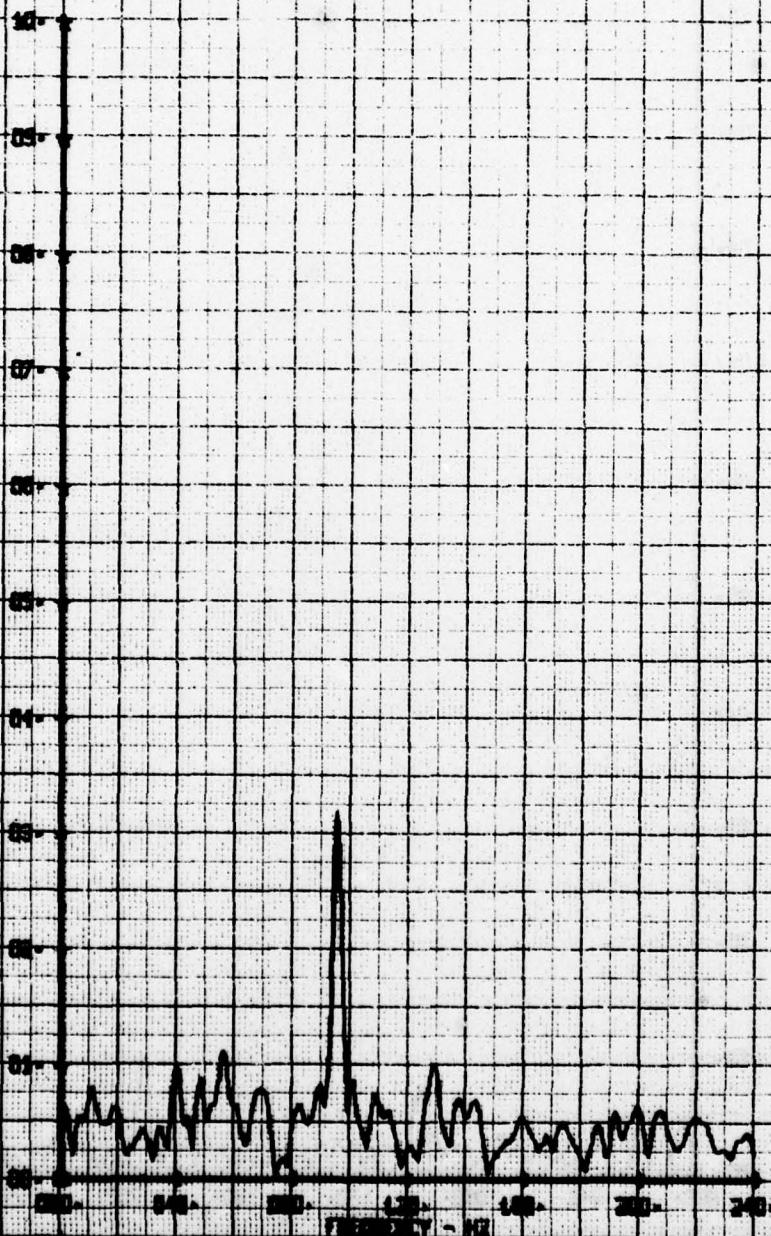
LATERAL FROM ANALYSIS - DEGREES



NOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ADV. CAN 100.3-28H.1-550.5
RUN 210 TP 3

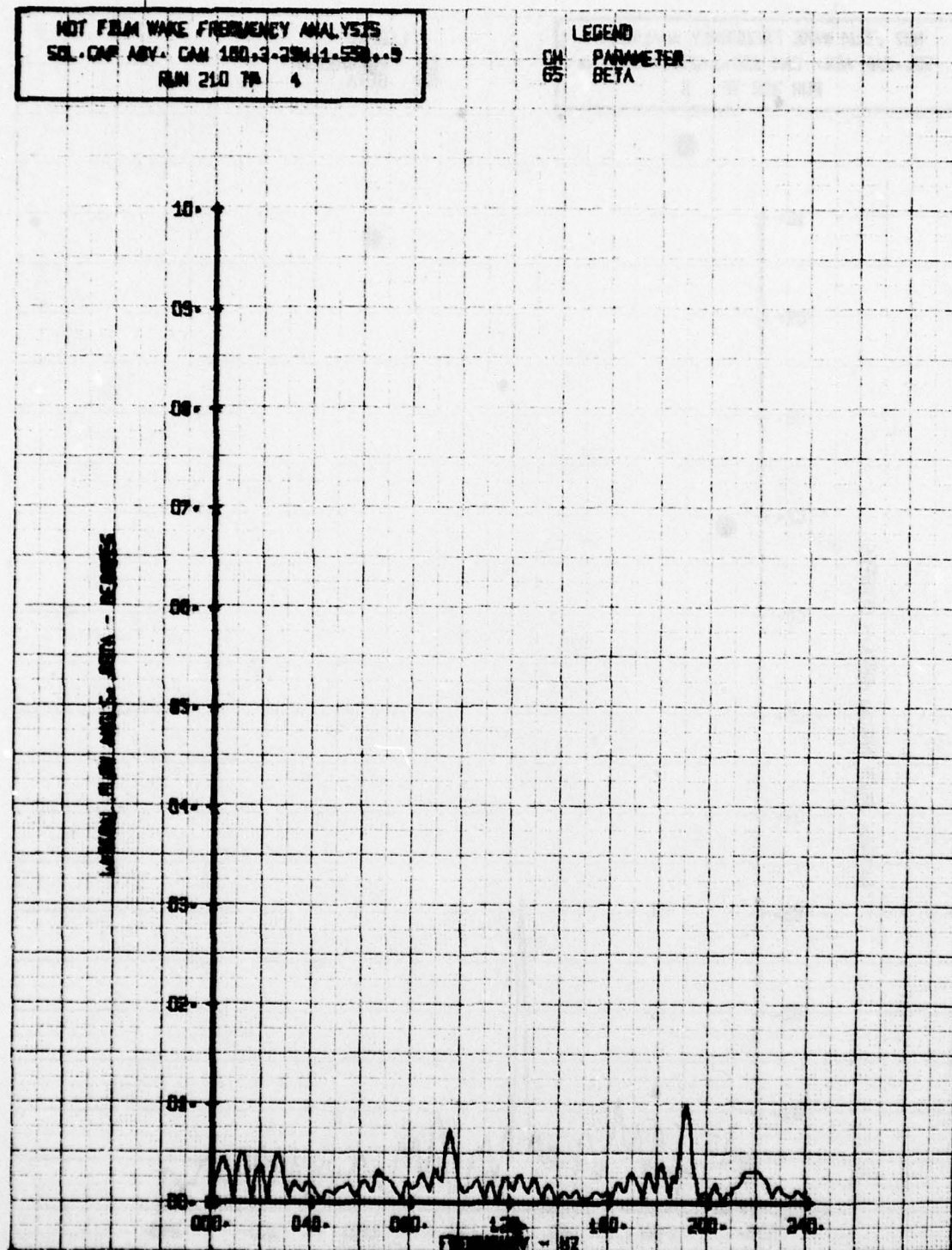
LEGEND
CH 65 PARAMETER
BETA

NORMALIZED AMPLITUDE - DBMS



NOT FILM WAKE FREQUENCY ANALYSIS
SEL. CAP. ASY. CAM 180.3-33M+1-550.9
RUN 210 TA 4

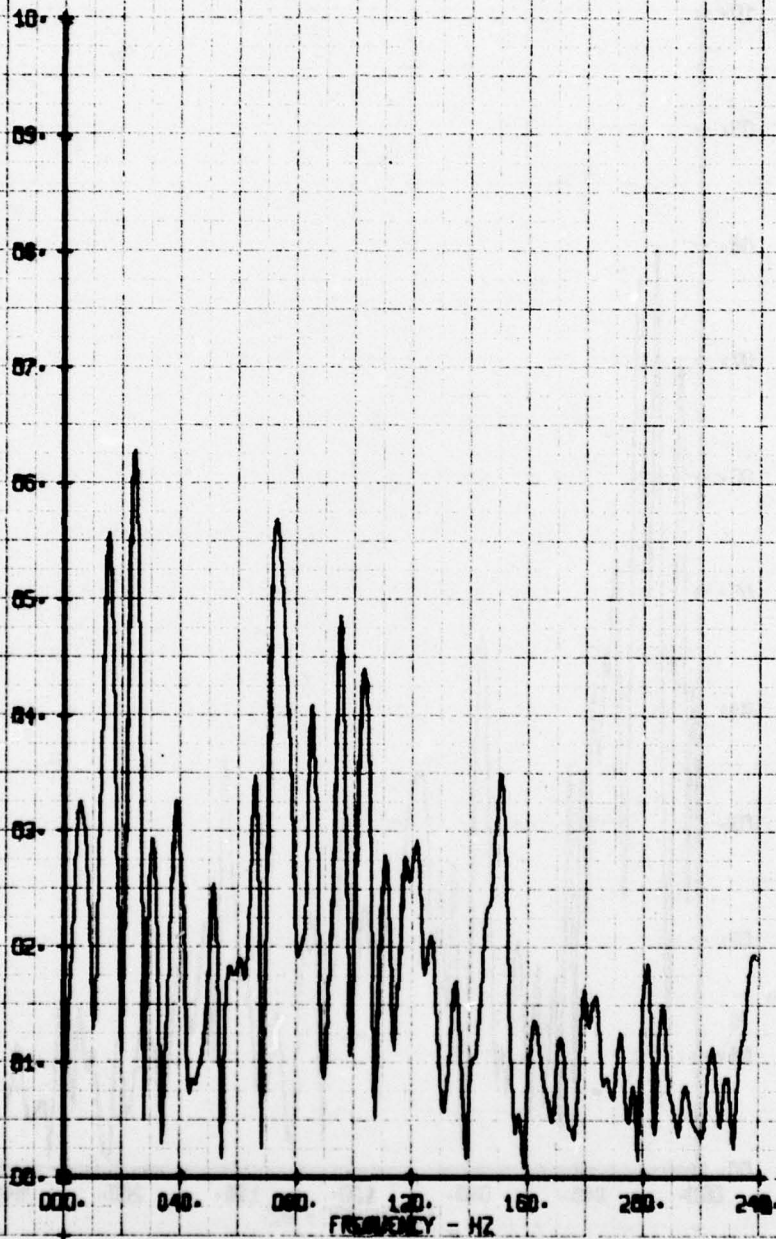
LEGEND
CH 65 PARAMETER
65 BETA



HOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ADV. CAN 100.3-25H-1-550..5
RUN 210 TP 1

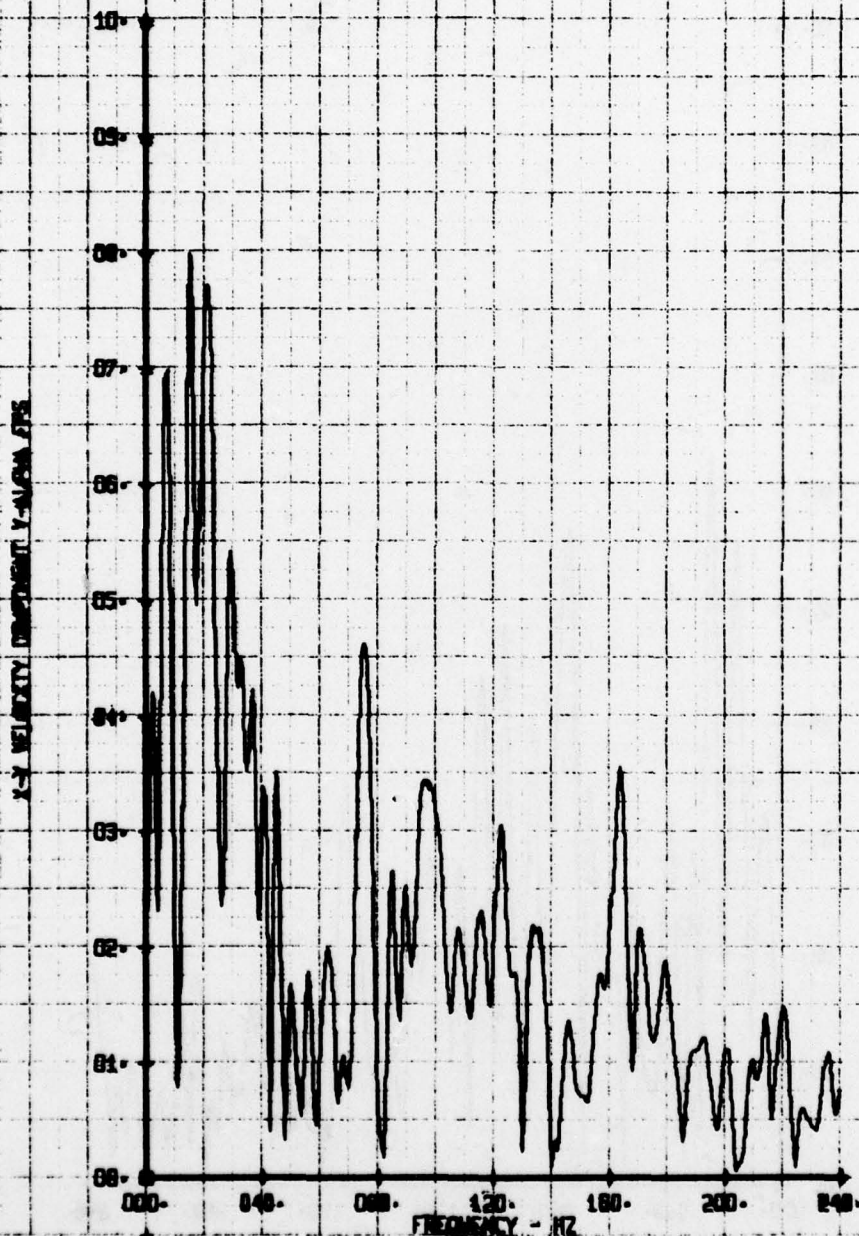
LEGEND
CH 66
PARAMETER
V-ALPHA

V-ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
 SOL - CAP 10Y - CAP 100-3-25H-1-550--5
 RUN 210 TP 2

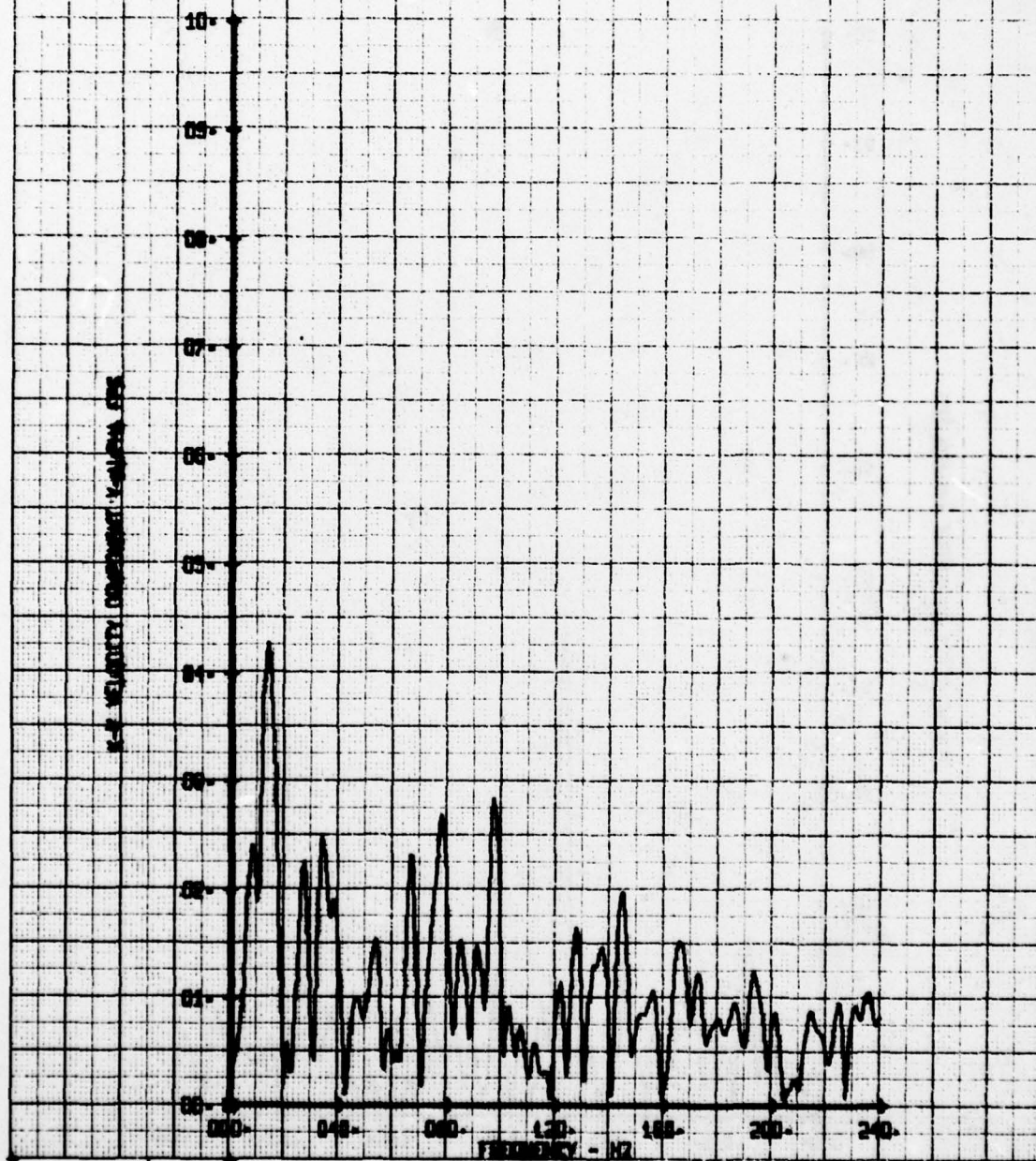
LEGEND
 CH 06
 PARAMETER
 V-ALPHA



HOT FILM WAKE FREQUENCY ANALYSIS
SOL-CAR ABY- CAN 100-3-25H-1-550--S
RUN 210 TP 3

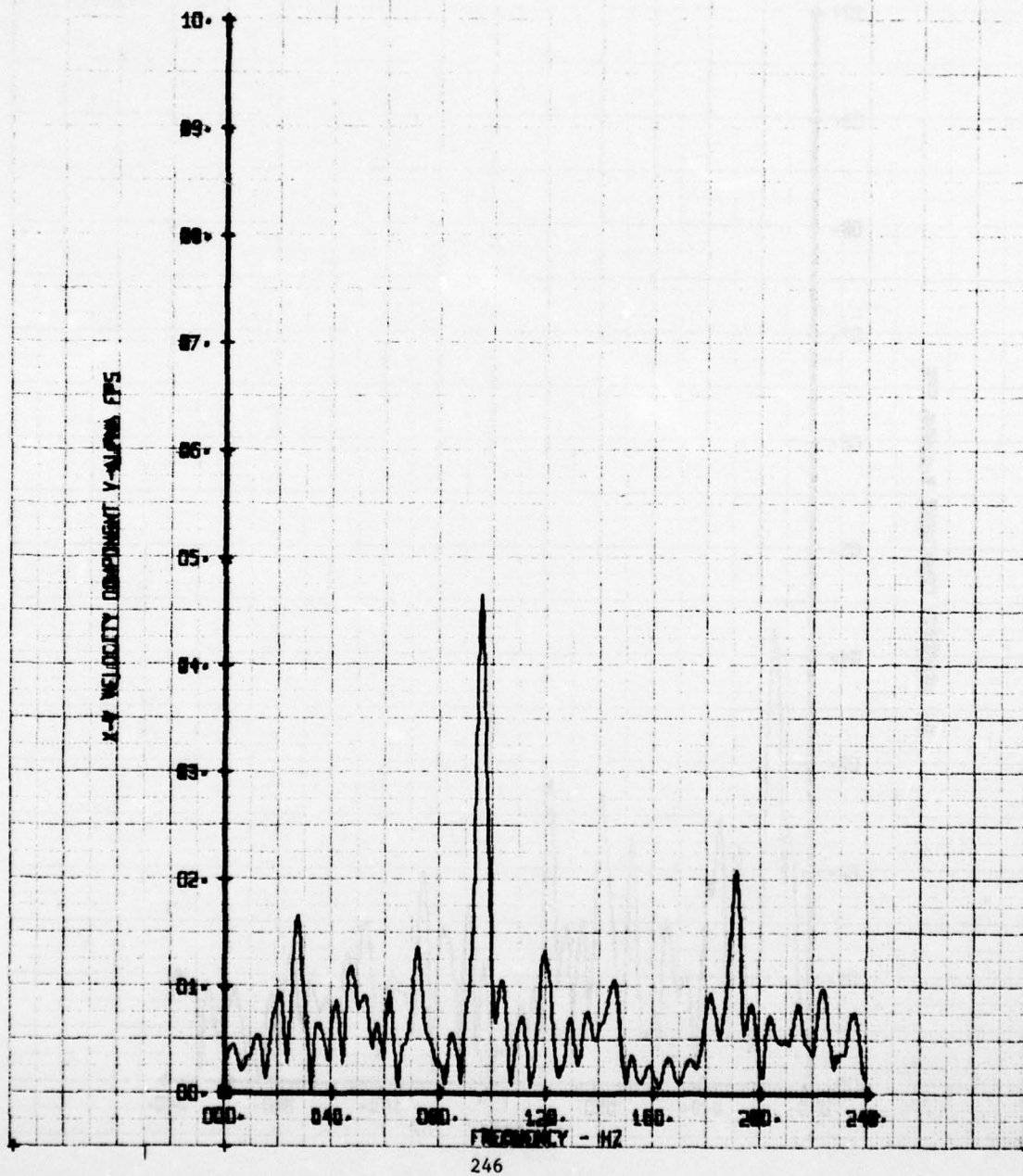
LEGEND
CH PARAMETER
65 V-ALPHA

V-ALPHA COMPONENT V-ALPHA RMS



NOT FILM WAKE FREQUENCY ANALYSIS
SOL-CAP ADV. CAN 100,3-25H,1-550,.3
RUN 210 TP 4

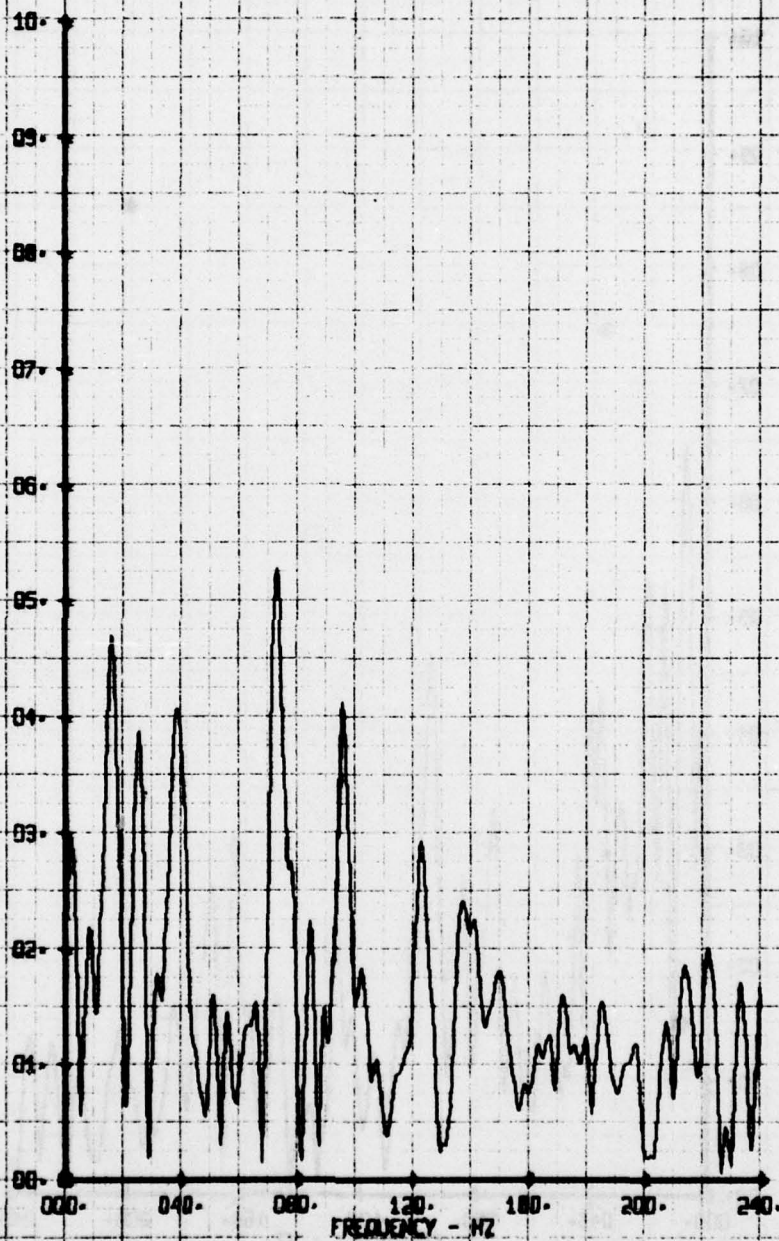
LEGEND
ON PARAMETER
66 V-ALPHA



NOT FILM WAKE FREQUENCY ANALYSIS
SOL. CAP. ADV. CAN 100.3-25H.1-530.5
RUN 210 TP 1

LEGEND
CH 65 PARAMETER
V-BETA

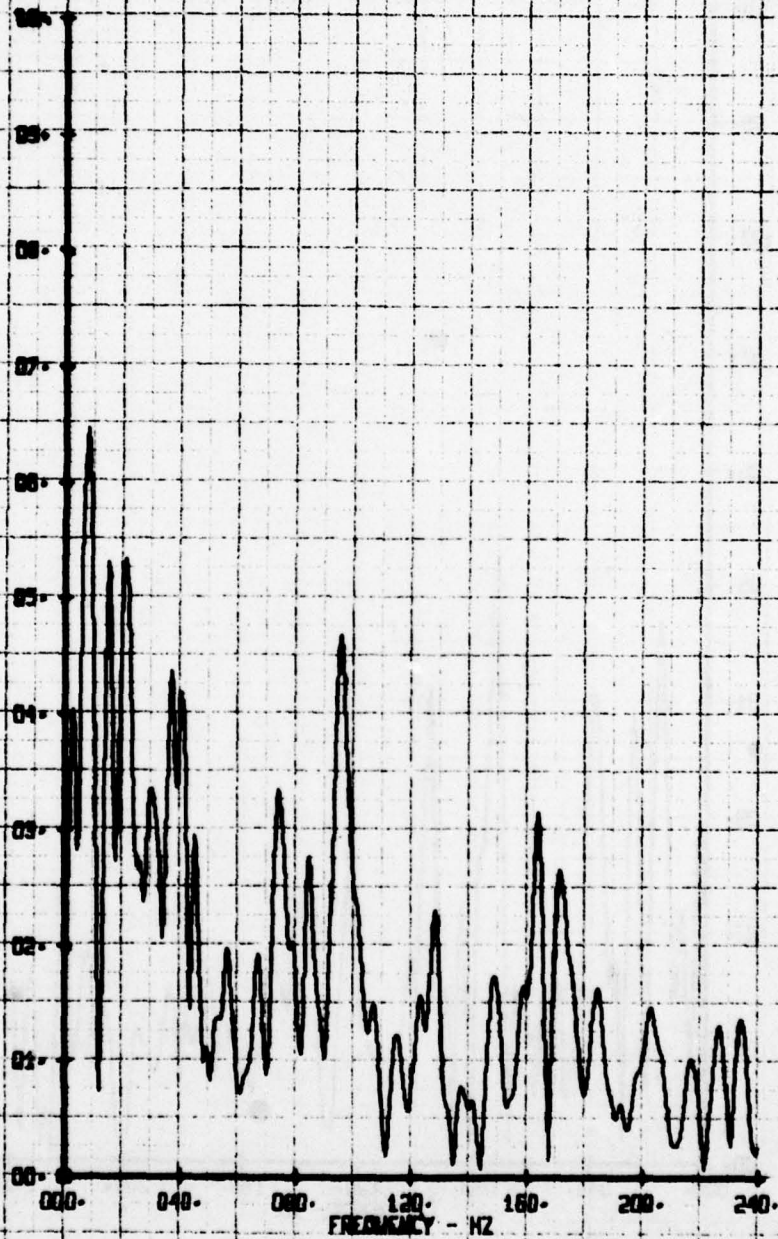
X-2 VELOCITY COMPONENT V-BETA FFS



NOT FILM WAVE FREQUENCY ANALYSIS
 SOL CAP ABY CAN 100-3-25H-1-550-5
 RUN 210 TP 2

LEGEND
 CH1 PARAMETER
 B5 V-BETA

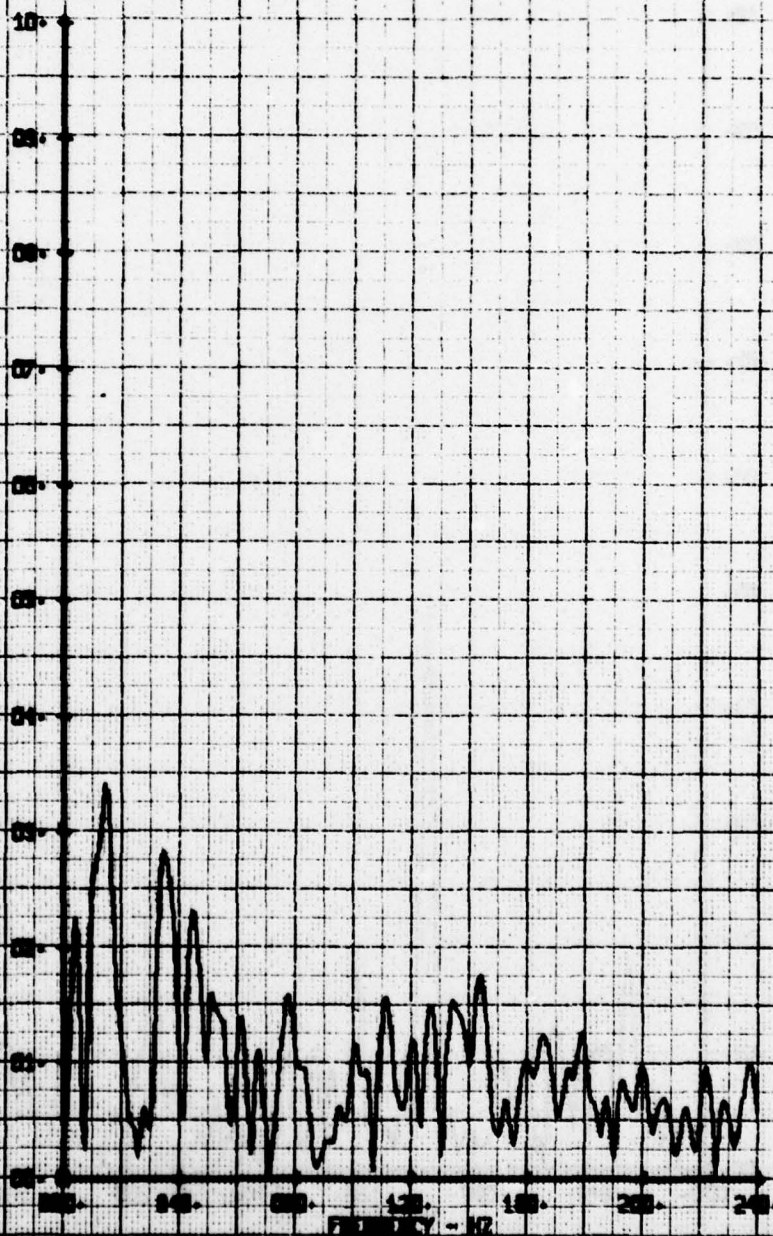
V-BETA COMPONENT V-BETA FREQ



HOT FILM WAKE FREQUENCY ANALYSIS
 SOL-CAP ARV CAN 100-2-25N-1-550-5
 RUN 210 TP 3

LEGEND
 CH. PARAMETER
 05 V-BETA

1-2 V-BETA CORRECTION 1-550-5



NOT FILM WAKE FREQUENCY ANALYSIS
SOL-CAP ABV. CAN 100-3-29N-1-550-0-5
RUN 210 TP 4

LEGEND
CH 65 PARAMETER
V-BETA

X-2 VELOCITY COMPONENT V-BETA FFS

